Examiners' Report
Lead Examiner Feedback

June 2022

Pearson BTEC Nationals
In Applied Human Biology (21325L)
Unit 1: Principles of Applied Human Biology

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link

Awarding BTEC qualifications in 2022

Ofqual has set out their plans for awarding qualifications in 2022 and intend to return to a normal, pre-pandemic, approach to grading standards over by 2023. They have confirmed that 2022 will be a transition year, to reflect that we are in a pandemic recovery period and students' education has been disrupted.

Our guiding principle and approach to awarding BTEC qualification results in 2022 will be to ensure parity in relation to the approach being taken for GCSE and A level learners. BTEC courses have a different structure and design to academic qualifications - BTECs are modular qualifications (with assessments taking place throughout the course) compared to GCSEs and A levels which

are linear (assessed and awarded at the same time at the end of the year), and therefore our approach needs to be different.

In 2022 we will return to the usual method of calculating BTEC qualification results, however adaptations including, U-TAGs and reduced internal assessment, are in place to provide a comprehensive package of support for students.

The basis of our awarding approach to BTECs this year is to ensure it is as fair as possible for all learners. We will use a range of evidence to set grade boundaries for the external units. Part of this evidence will be to closely monitor learner performance in all assessments that contribute to learners' final qualification grade, to ensure parity with A level and GCSEs.

Further information can be found on our website and via our Social Media channels.

Introduction

This is the fourth sitting of this unit and learners continue to be increasingly well prepared for the demands of the question paper. This was demonstrated particularly in the longer open response questions and in questions which required application of knowledge within a given context. This series, we have seen more learners engaging with the 6 mark and 9-mark questions in an effective way, with a higher average score on these items than in previous sittings. Learners this series appear to have a broader knowledge of topics across the scope of the specification and we continue to see an improvement in how learners can communicate their understanding within the context of the examination.

Introduction to the Overall Performance of the Unit

This series we saw an even broader spread of marks across the paper than in previous series, with many learners able to show an impressive level of knowledge and understanding across the breadth of the specification. As the qualification progresses it appears that more and more learners are able to demonstrate their learning across the full range of topics covered by the unit. Learners appeared to manage their time well in this examination with questions evenly answered throughout the paper.

In this series we saw fewer instances of learners repeating the content of the stem or the stimulus as their answer to a question. There was also an improvement in exam technique compared with the last series. Learners do continue to give the same marking point multiple times in the same response, often this is when a statement is made and then the learner goes on to state the converse as well – this has been seen in previous papers where comparisons have been asked for and the same pattern was observed here. Specific examples of this have been highlighted in the Individual Questions section of this report.

For this series it appeared that some learners found the finer details of certain topics within the specification challenging. Recall questions where learners needed to name a specific biological molecule, organ or organelle also seemed challenging for learners. This was also the case for questions in which learners needed to state a function or cause within the context of a named body system.

Where questions required a more broad-strokes approach to the content, there was evidence that in most cases learners had a good basic overview of each of the body systems covered within the paper. Generally, the best performance by learners was seen when they were given room to demonstrate their knowledge without requiring a specific context, this included questions which provided stimulus information or asked for a broader discussion or explanation of a biological process or system. This could particularly be seen in the extended open response question in which learners evaluated different forms of diagnostic testing, explained non-specific defenses against pathogens and discussed the causes for Type 1 and Type 2 diabetes.

Questions on the immunology section of the specification continue to show an improvement in terms of learner responses, it appears that normal function of the immune system is increasingly well understood although some ideas, such as the difference between active and passive immunity, proved to be less well understood. The questions on the neuroscience topic indicated that in general learners had a basic knowledge of the key concepts but were not able to apply this to specific contexts within the questions, particularly those which bridged more than one area of the specification such as the questions on nerve conduction velocity and multiple sclerosis towards the end of the paper.

Individual Questions

Question 1ai

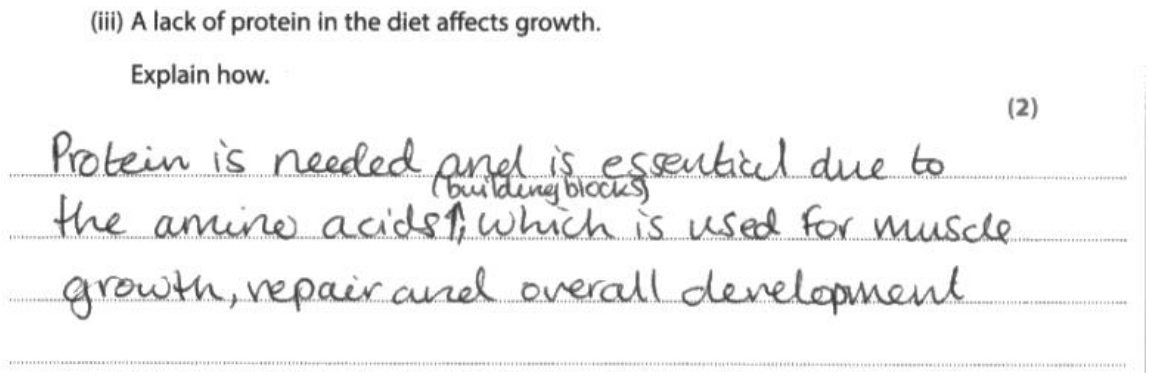
This question was answered correctly by most learners who could accurately identify the type of bond linking two amino acids within a molecule of protein.

Question 1aii

The majority of learners did not answer this question correctly by identifying trypsin as the enzyme responsible for breaking down protein in the small intestine. Many learners chose option A, “amylase”, instead – identifying an enzyme used in the digestive system but not the correct one.

Question 1aiii

An example of a response scoring both marks for this question can be seen below:


(iii) A lack of protein in the diet affects growth.

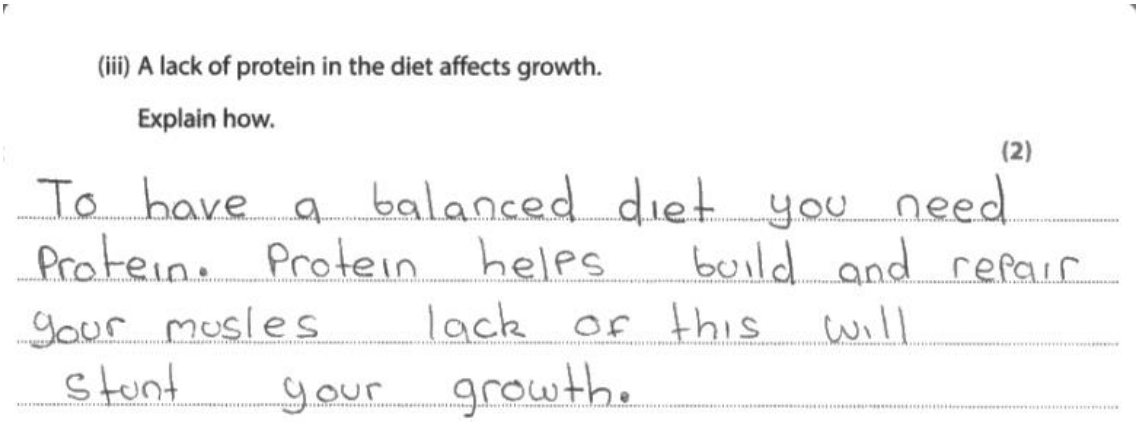
Explain how.

(2)

Protein is needed and is essential due to the amino acids (building blocks), which is used for muscle growth, repair and overall development

Here the learner has correctly linked the amino acids present within the dietary protein to the process building muscle tissue within the body.

However, in most cases learner responses to this question only scored 1 out of a possible 2 marks. A typical example of a response scoring 1 mark can be seen below:


(iii) A lack of protein in the diet affects growth.

Explain how.

(2)

To have a balanced diet you need Protein. Protein helps build and repair your musles lack of this will stunt your growth.

The learner has identified that lack of protein can stunt growth for 1 mark but has not expanded on this to explain why – this was very common and showed that the command word of the question had not been correctly addressed. Phrasing of responses to this question was often generic and many repeated the stem of the question. Incorrect ideas about protein "containing energy" were seen frequently as were ideas about healthy bone growth.

Question 1bi

Very few learners could correctly identify Vitamin K as having a role in blood clotting after injury. The roles of vitamins beyond those addressed at Level 2 - vitamin C, vitamin D and vitamin A - appear to not have been well understood by learners.

Question 1bii

This question was answered fairly well with most learners scoring at least 1 of the 2 marks. An example of a learner response scoring both marks can be seen below:

(2)

1 Sun light

2 Green, leafy vegetables.

(Total for Question 1 = 7 marks)

Other common correct suggestions from learners included Vitamin D supplements, red meat and dairy.

An example of a learner response scoring 1 mark is below:

(ii) Vitamin D is needed for healthy bone growth.

Oily fish is a good source of vitamin D.

Identify **two other** sources of vitamin D.

(2)

1 Sunlight

2 Oranges

(Total for Question 1 = 7 marks)

Most learners were able to identify sunlight as a source of vitamin D but often gave a source more commonly associated with vitamin C, vitamin A or minerals such as potassium as their second response, as can be seen in the example above.

Question 2ai

Learners found this question challenging, in many cases marks were lost due to responses lacking specificity. An example of such a response can be seen below:

2 Human cells have many organelles.

(a) (i) Complete Table 1 to show the name and function of some organelles found inside human cells.

(3)

name of organelle	function of organelle
80s ribosome	synthesis
nucleus	contains the chromosomes
Golgi apparatus	packaging and transporting

Table 1

Here the learner has correctly identified the nucleus but has not been clear enough on the functions for the 80s ribosome or the Golgi apparatus as they have not named the biological molecules concerned in either case. This response scored 1 mark.

An example of a response scoring all 3 marks can be seen below:

2 Human cells have many organelles.

(a) (i) Complete Table 1 to show the name and function of some organelles found inside human cells.

(3)

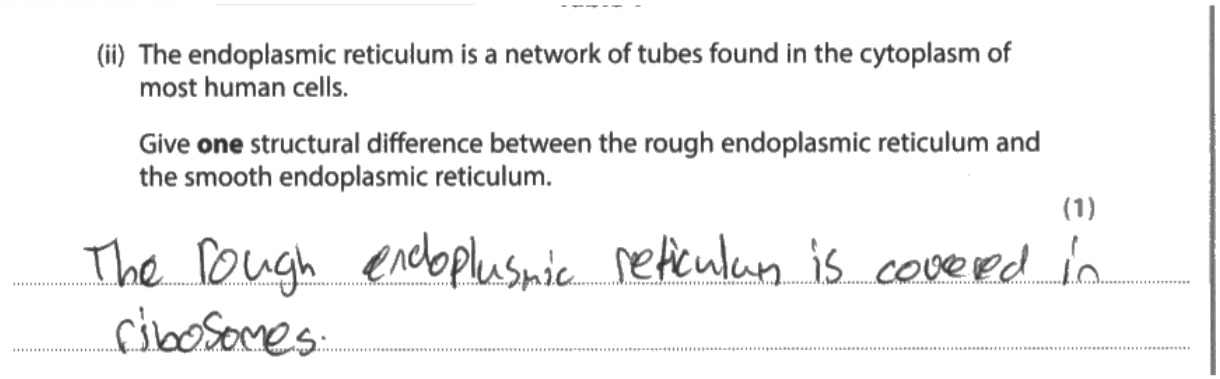
name of organelle	function of organelle
80s ribosome	protein synthesis
nucleus / nucleolus	contains the chromosomes
Golgi apparatus	packages and modifies proteins

Table 1

Although this learner gave a list for the missing organelle and for the function of the Golgi apparatus there is no contradiction or incorrect response in either case so the marks could be given.
However, there were many cases where learners provided lists of functions for the Golgi apparatus with some correct and some incorrect suggestions listed; in these cases the mark could not be awarded – it is very important that learners give the correct number of responses in questions such as these so that they do not end up missing marks.

Question 2aii

Responses to this question often did not gain credit because of lack of specificity. An example of a correct learner response can be seen below:



(ii) The endoplasmic reticulum is a network of tubes found in the cytoplasm of most human cells.

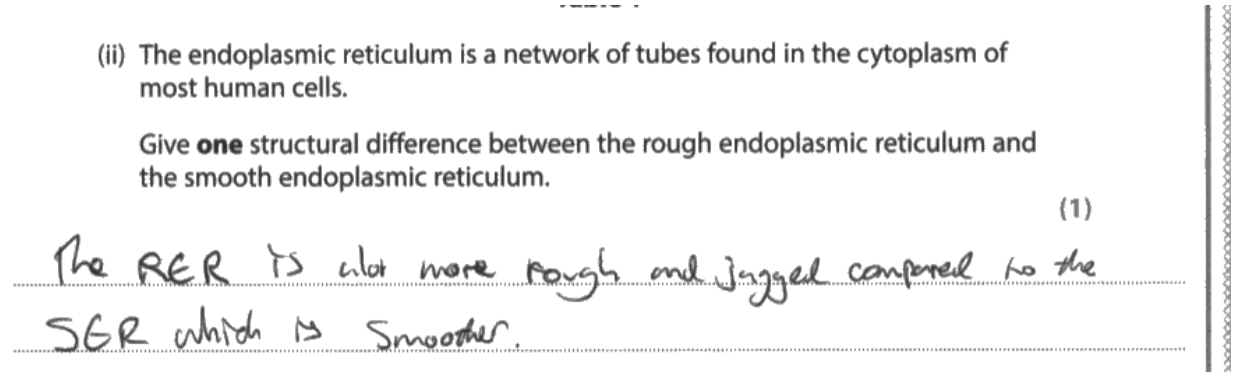
Give **one** structural difference between the rough endoplasmic reticulum and the smooth endoplasmic reticulum.

(1)

The Rough endoplasmic reticulum is covered in ribosomes.

This learner has been given the mark for this response. Note, although they have not mentioned the smooth endoplasmic reticulum, the statement about the ribosomes present on the rough endoplasmic reticulum is sufficient for the mark.

An example of a response which did not score any marks for this question can be seen below:



(ii) The endoplasmic reticulum is a network of tubes found in the cytoplasm of most human cells.

Give **one** structural difference between the rough endoplasmic reticulum and the smooth endoplasmic reticulum.

(1)

The RER is alot more rough and jagged compared to the SER which is smoother.

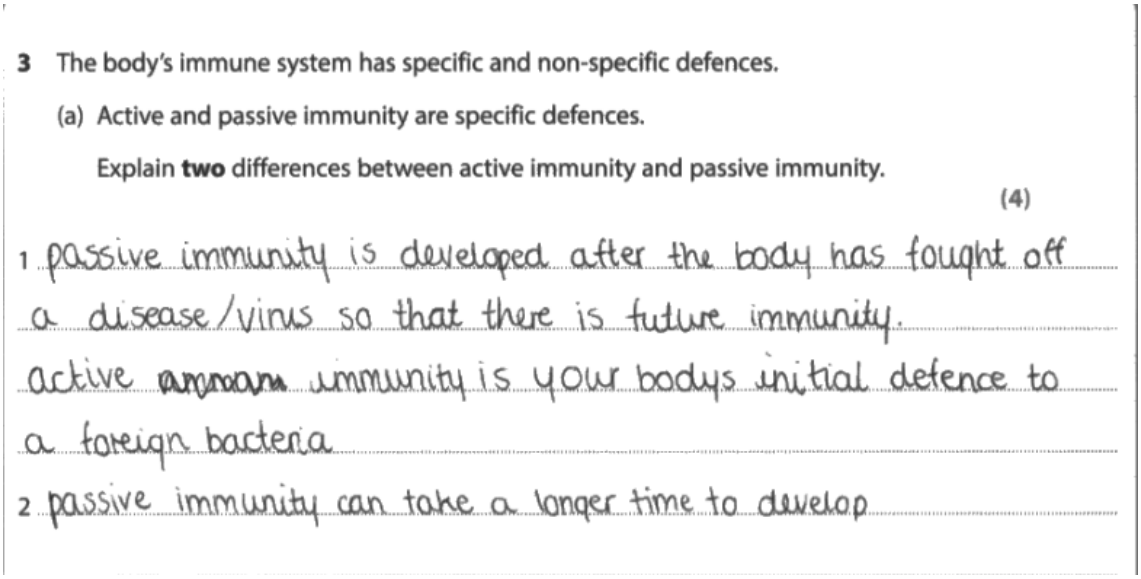
Responses such as these were relatively common, more detail is needed to be given a mark here as these descriptions act as a repeat of the information given in the stem.

Question 2b

Most learners were able to identify one or more transport mechanisms which used ATP. Where learners only scored 1 of the 2 marks this was usually for correct identification of active transport and then an incorrect second choice. Facilitated diffusion was a common incorrect response, as has been seen in previous papers there is a misconception held by some learners that facilitated diffusion is an active process.

Question 3a

Learners found this question challenging with over half of responses not scoring any marks at all. There appears to have been confusion between the idea of active/passive immunity and the idea of acquired/innate immunity. Also seen were responses which seemed to answer in terms of primary and secondary immune response – as seen in the example below:



3 The body's immune system has specific and non-specific defences.

(a) Active and passive immunity are specific defences.

Explain **two** differences between active immunity and passive immunity.

(4)

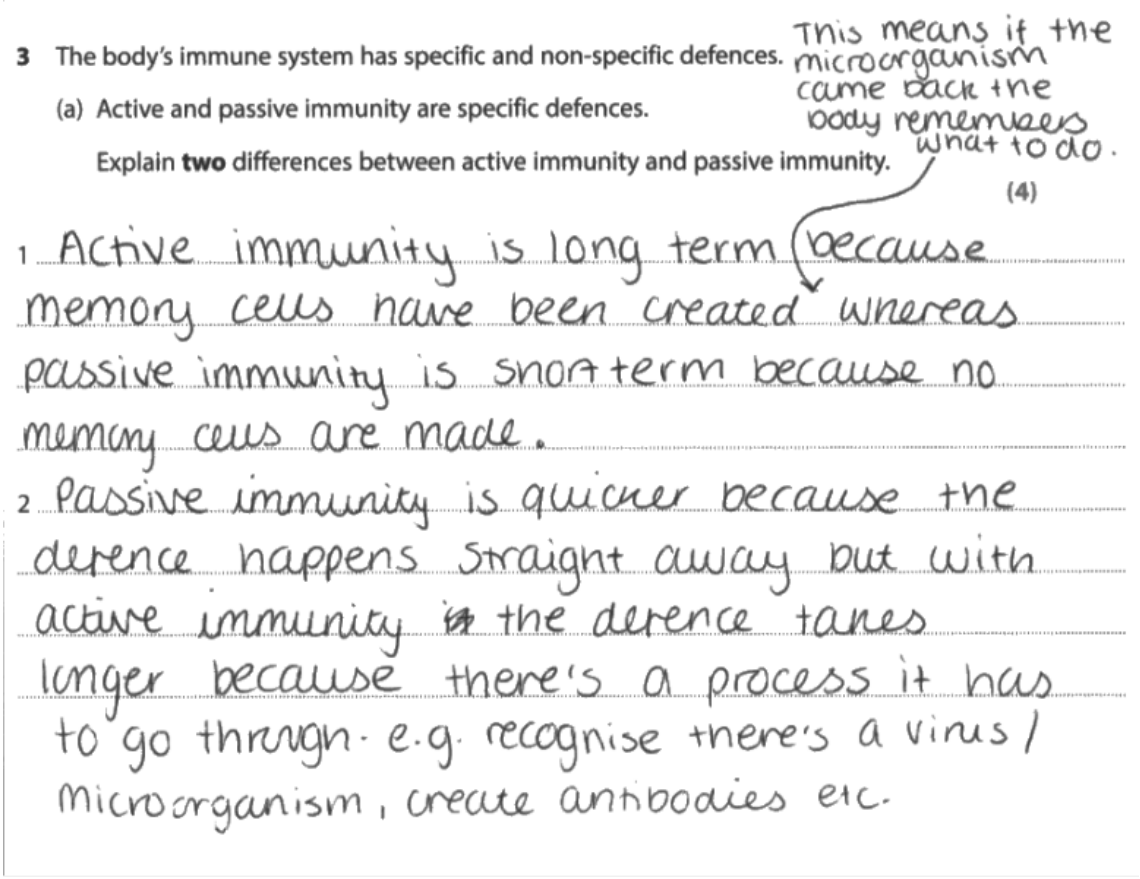
1 passive immunity is developed after the body has fought off a disease/virus so that there is future immunity.

active ~~amm~~ immunity is your bodys initial defence to a foreign bacteria

2 passive immunity can take a longer time to develop

The learner has scored 0 marks out of 4 as they have not correctly understood the key terms in the question.

In this question, learners also lost marks because of the way they approached the command word.
Learners have been asked to explain two differences between the different types of immunity, with two marks available for each difference – one mark for the identification of the difference and the second for an expansion to explain that difference. An example of a response where a learner has done this very well can be seen below:



3 The body's immune system has specific and non-specific defences.

(a) Active and passive immunity are specific defences.

Explain **two** differences between active immunity and passive immunity.

(4)

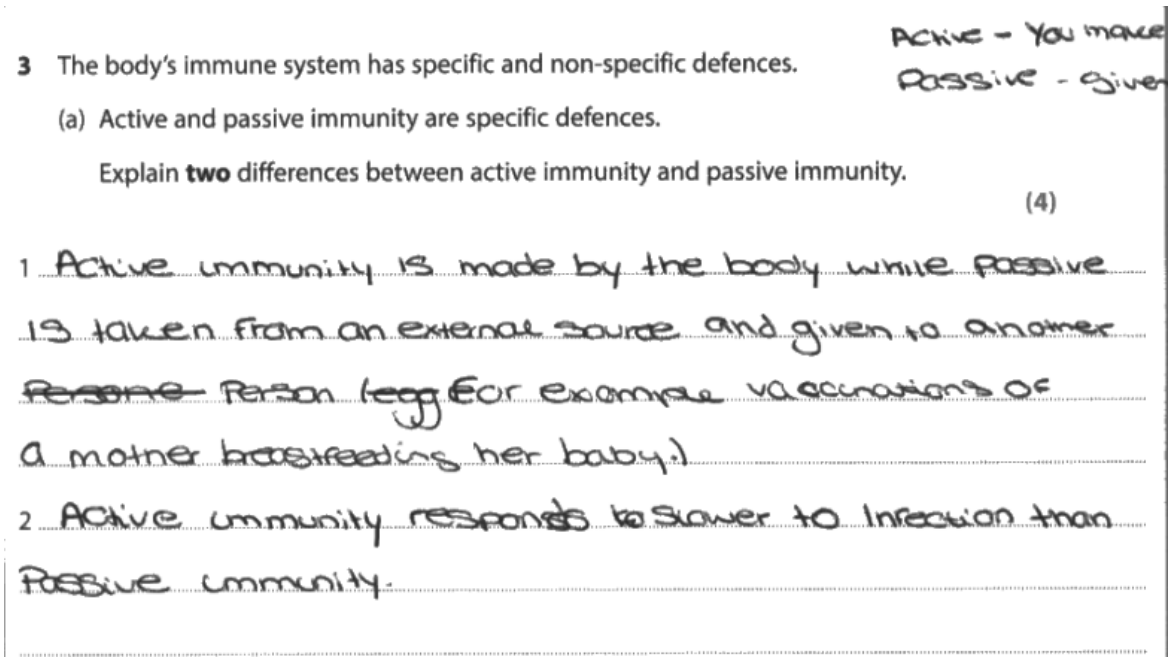
This means if the microorganism came back the body remembers what to do.

1 Active immunity is long term because memory cells have been created whereas passive immunity is short term because no memory cells are made.

2 Passive immunity is quicker because the defence happens straight away but with active immunity the defence takes longer because there's a process it has to go through. e.g. recognise there's a virus / microorganism, create antibodies etc.

This response scored 4 marks – the learner has identified two differences (how long the immunity lasts and the speed of the response in each case) and has expanded on each one to correctly explain why these differences occur.

More common in responses which scored any marks on this question were ones which followed the format for the response below:



Active - You make
Passive - given

3 The body's immune system has specific and non-specific defences.

(a) Active and passive immunity are specific defences.

Explain **two** differences between active immunity and passive immunity.

(4)

1 Active immunity is made by the body while passive is taken from an external source and given to another ~~person~~ Person (egg for example vaccinations of a mother breastfeeding her baby.)

2 Active immunity responds to slower to infection than passive immunity.

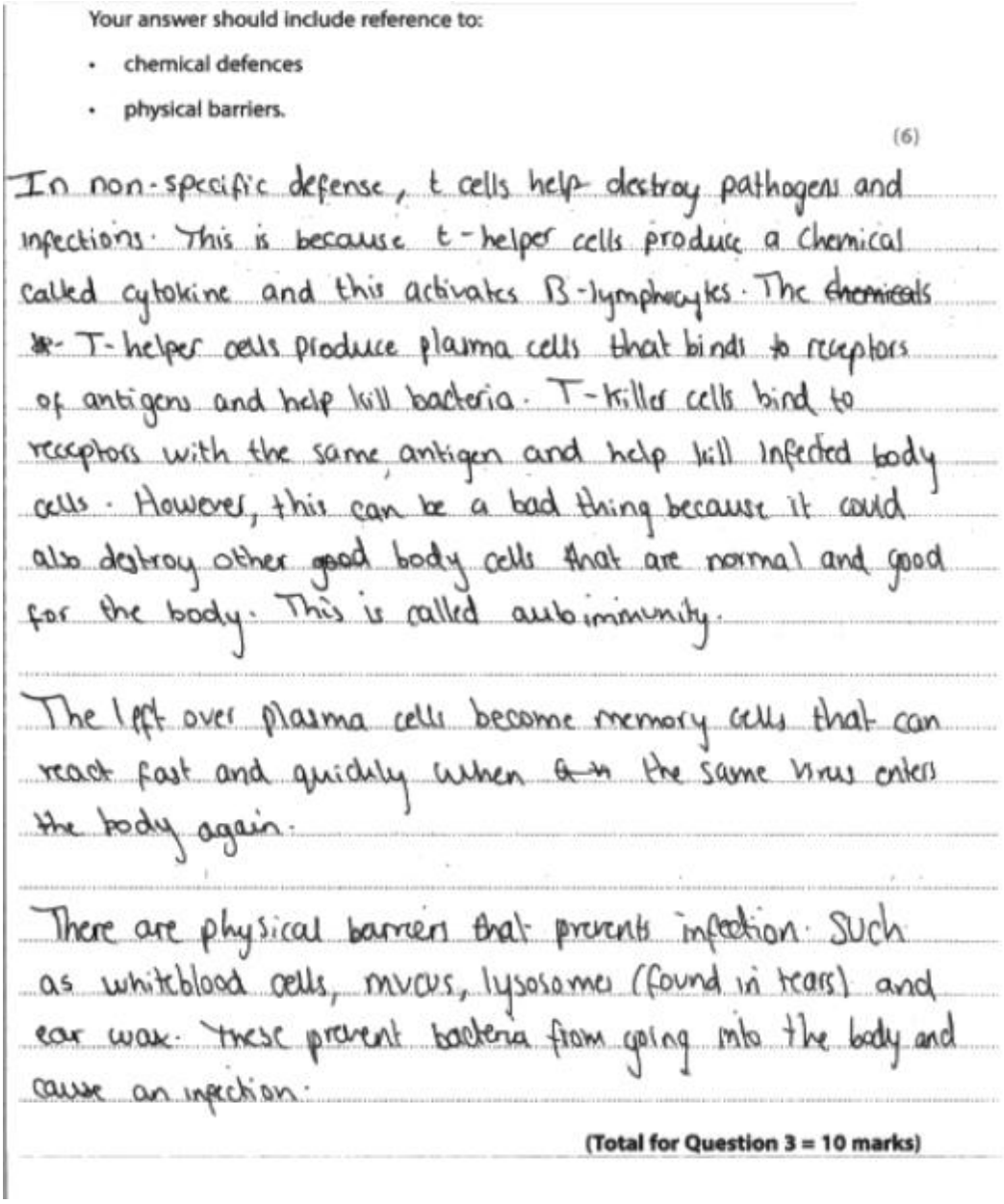
Here the learner has identified two differences but neither one has been expanded on to provide an explanation. For the first difference, the source of the immunity, the response makes a statement about active immunity and then goes on to state the converse about passive immunity – this is the same marking point twice and so is only credited for 1 mark. Likewise, the comparison in speed of response for the second difference is also only worth 1 mark as there is not an expansion explaining why.

These types of responses are common where learners are asked to explain the difference between two processes, systems, biological molecules etc. and it is an important element of exam technique for learners to understand that when the command word is "explain" a statement and then the converse will not be sufficient for two marks.

Question 3b

This question was well understood in many cases, with some very good learner responses seen.

Where learners scored a mark in Level 1 this was usually due to a misunderstanding over the context of the question. Incorrect categorisation of defences was common. Where learners had incorrectly identified a chemical defence as physical or vice versa this did not limit the response to a Level 1 however, more common were responses which described the action of antibodies or lymphocytes as non-specific defences. An example response can be seen below:



Your answer should include reference to:

- chemical defences
- physical barriers.

(6)

In non-specific defense, t cells help destroy pathogens and infections. This is because t-helper cells produce a chemical called cytokine and this activates B-lymphocytes. The ~~chemicals~~ T-helper cells produce plasma cells that binds to receptors of antigens and help kill bacteria. T-killer cells bind to receptors with the same antigen and help kill infected body cells. However, this can be a bad thing because it could also destroy other good body cells that are normal and good for the body. This is called autoimmunity.

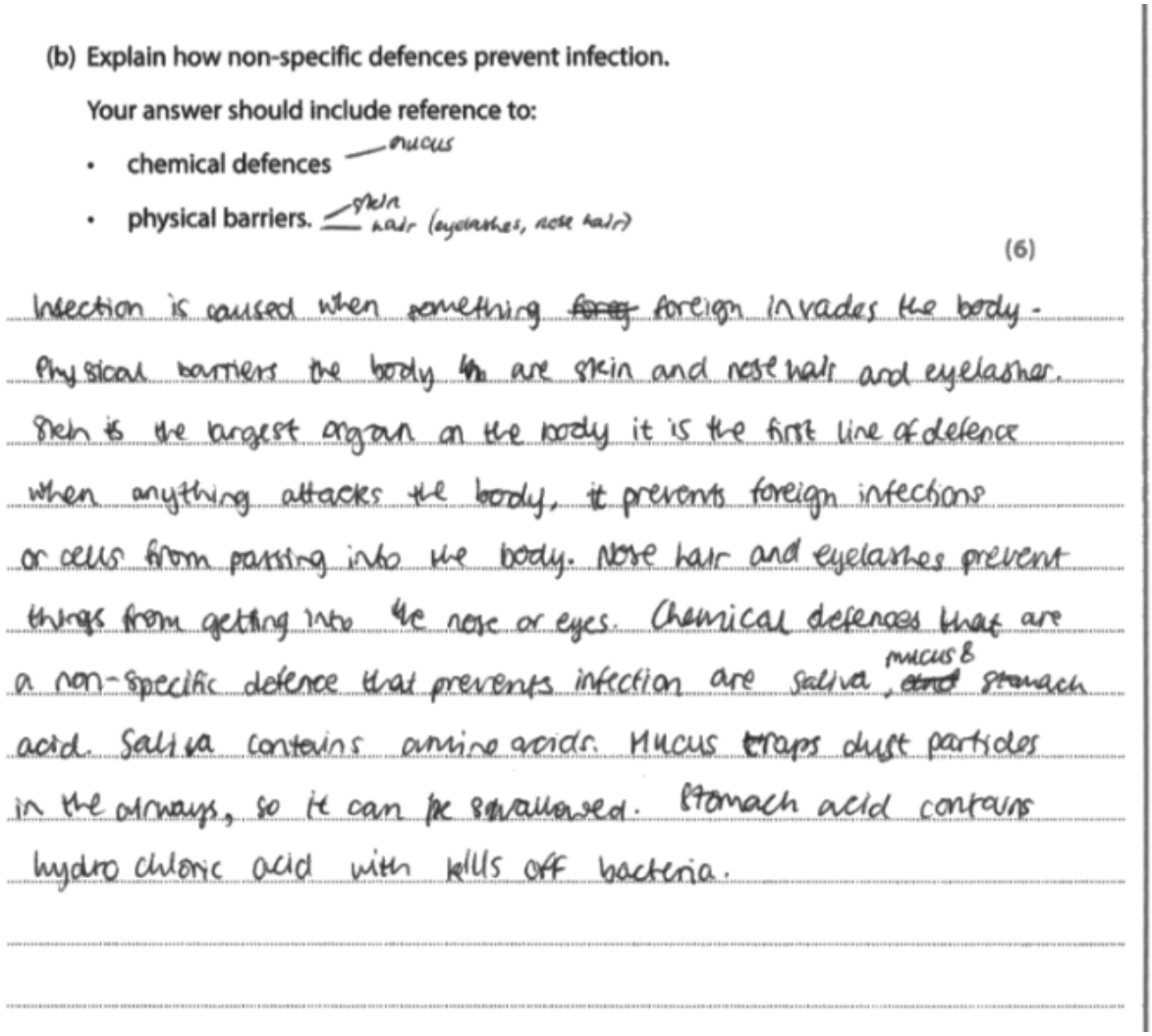
The left over plasma cells become memory cells that can react fast and quickly when ~~a~~ the same virus enters the body again.

There are physical barriers that prevents infection. Such as whiteblood cells, mucus, lysosomes (found in tears) and ear wax. These prevent bacteria from going into the body and cause an infection.

(Total for Question 3 = 10 marks)

Although the learner did not achieve many marks here, they were still given credit for their ideas at the end of their answer – some chemical and physical defences were listed making this a limited response in terms of knowledge and understanding and so this scored in Level 1. In several cases learners answered in terms of medication such as antibiotics as a chemical defence and discussed masks, gloves etc as physical defenses - these responses could not be given credit as they do not relate to the over all context of the question which is the body's immune system.

More common were responses placed in Level 2, an example of such a response can be seen below:



(b) Explain how non-specific defences prevent infection.

Your answer should include reference to:

- chemical defences — mucus
- physical barriers. — skin, hair (eyelashes, nose hair)

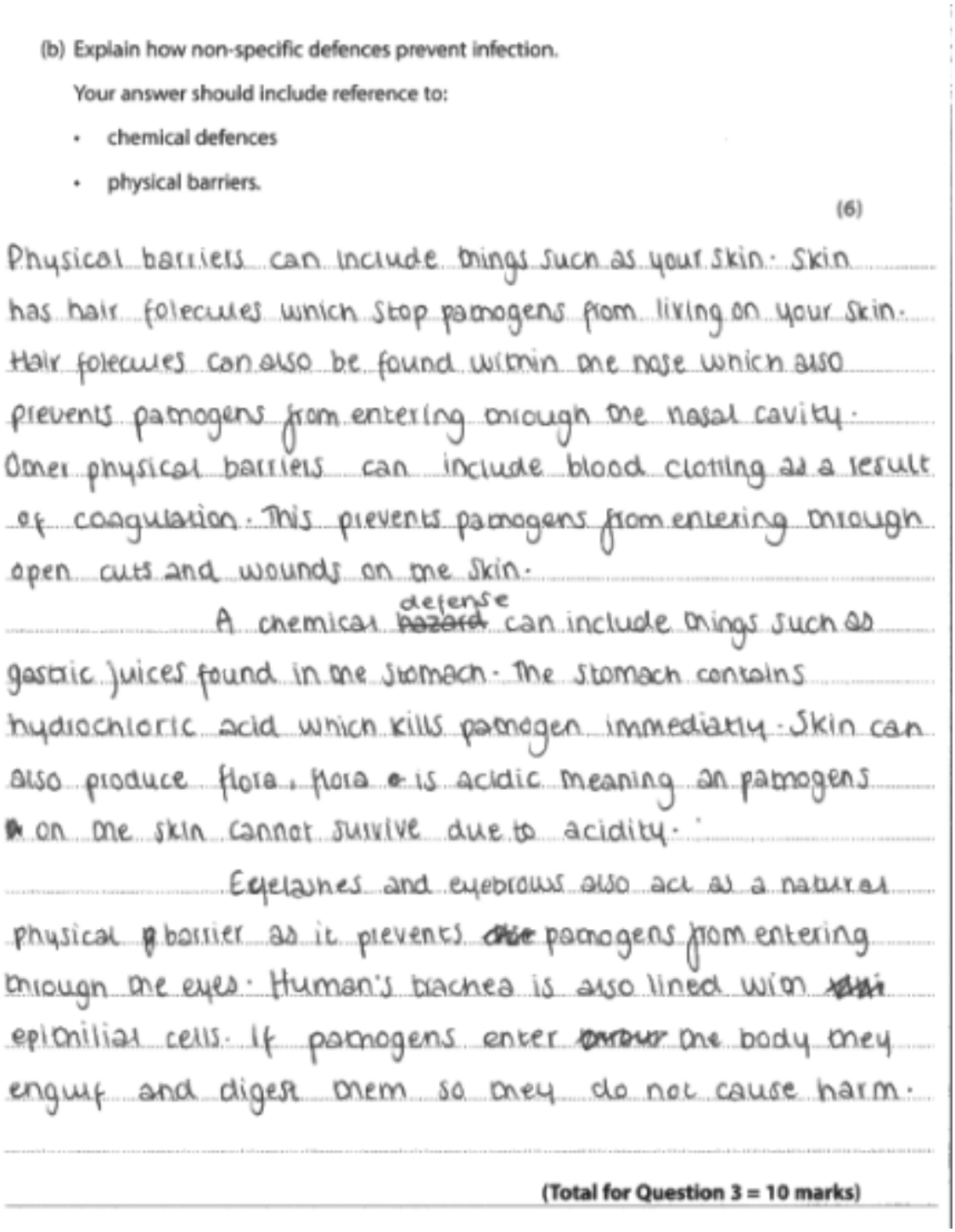
(6)

Infection is caused when ~~something~~ foreign invades the body. Physical barriers the body has are skin and nose hair and eyelashes. Skin is the largest organ on the body it is the first line of defence when anything attacks the body, it prevents foreign infections or cells from passing into the body. Nose hair and eyelashes prevent things from getting into the nose or eyes. Chemical defences that are a non-specific defence that prevents infection are saliva, mucus & ~~and~~ stomach acid. Saliva contains amino acids. Mucus traps dust particles in the airways, so it can be swallowed. Stomach acid contains hydrochloric acid with kills off bacteria.

Here the learner has given some examples of both physical and chemical defences, with an attempt at explanation and linking these features to the prevention of infection. This response is an example of

a partially developed explanation as the lines of reasoning are not as secure as they could be due to missing elements of the response. Level 2 responses commonly referred to “infection” and repeating the stem, but did not offer an expansion on this in terms of pathogens or an explanation of how each defence could either prevent pathogen entry into the body or cause the pathogen to be destroyed.

A response placed in the top level can be seen below:



(b) Explain how non-specific defences prevent infection.

Your answer should include reference to:

- chemical defences
- physical barriers.

(6)

Physical barriers can include things such as your skin. Skin has hair foleciles which stop pathogens from living on your skin. Hair foleciles can also be found within the nose which also prevents pathogens from entering through the nasal cavity. Other physical barriers can include blood clotting as a result of coagulation. This prevents pathogens from entering through open cuts and wounds on the skin.

A chemical ~~hazard~~ defense can include things such as gastric juices found in the stomach. The stomach contains hydrochloric acid which kills pathogen immediatly. Skin can also produce flora. flora is acidic meaning an pathogens on the skin cannot survive due to acidity.

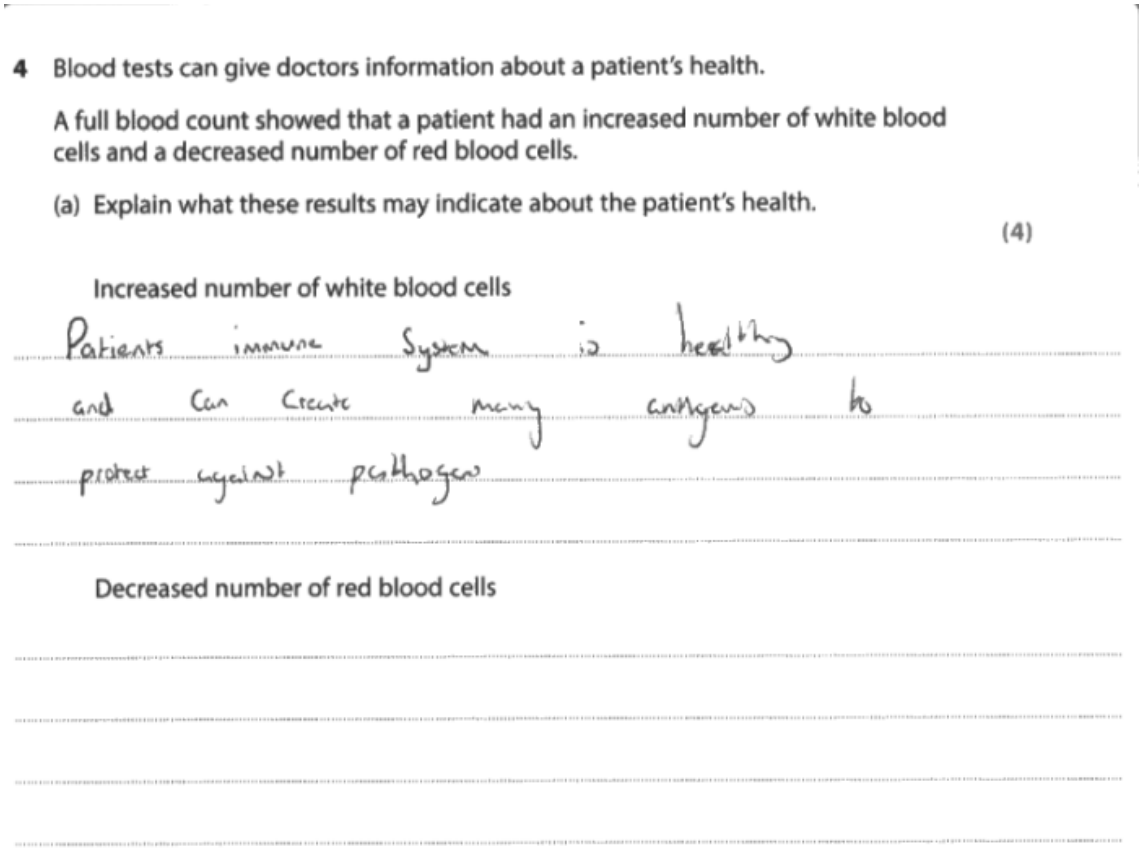
Eyelashes and eyebrows also act as a natural physical barrier as it prevents pathogens from entering through the eyes. Human's trachea is also lined with epithilial cells. If pathogens enter the body they engulf and digest them so they do not cause harm.

(Total for Question 3 = 10 marks)

Here the learner has named mostly the same defences as in the Level 2 response shown previously however their lines of argument are much more clearly defined because of the link between pathogens and infection with an explanation of how each defence prevents infection. There are some inaccuracies within the response – for example the function of epithelial cells was confused with phagocytes – but these do not detract from the positive qualities of the response and so it is still able to be placed in Level 3.

Question 4a

This question was answered well in many cases, with most learners scoring at least 1 of the 4 possible marks. Where responses were not able to be given credit, this was often due to the learner incorrectly giving their answer in terms of normal body function rather than within the context of cell count numbers which differ from the usual range. An example of a response demonstrating this can be seen below:



4 Blood tests can give doctors information about a patient's health.

A full blood count showed that a patient had an increased number of white blood cells and a decreased number of red blood cells.

(a) Explain what these results may indicate about the patient's health.

(4)

Increased number of white blood cells

Patients immune System is healthy and can create many antigens to protect against pathogens

Decreased number of red blood cells

Here the learner has linked white blood cells to the immune system but has not addressed the context of an increased white blood cell count – responses describing a "healthy" or "strong" immune system were seen fairly often.

The reasons for increased number of white blood cells were generally better understood by learners than those for the decreased number of red blood cells. An example of a learner response scoring 1 mark can be seen below.

4 Blood tests can give doctors information about a patient's health.

A full blood count showed that a patient had an increased number of white blood cells and a decreased number of red blood cells.

(a) Explain what these results may indicate about the patient's health.

(4)

Increased number of white blood cells

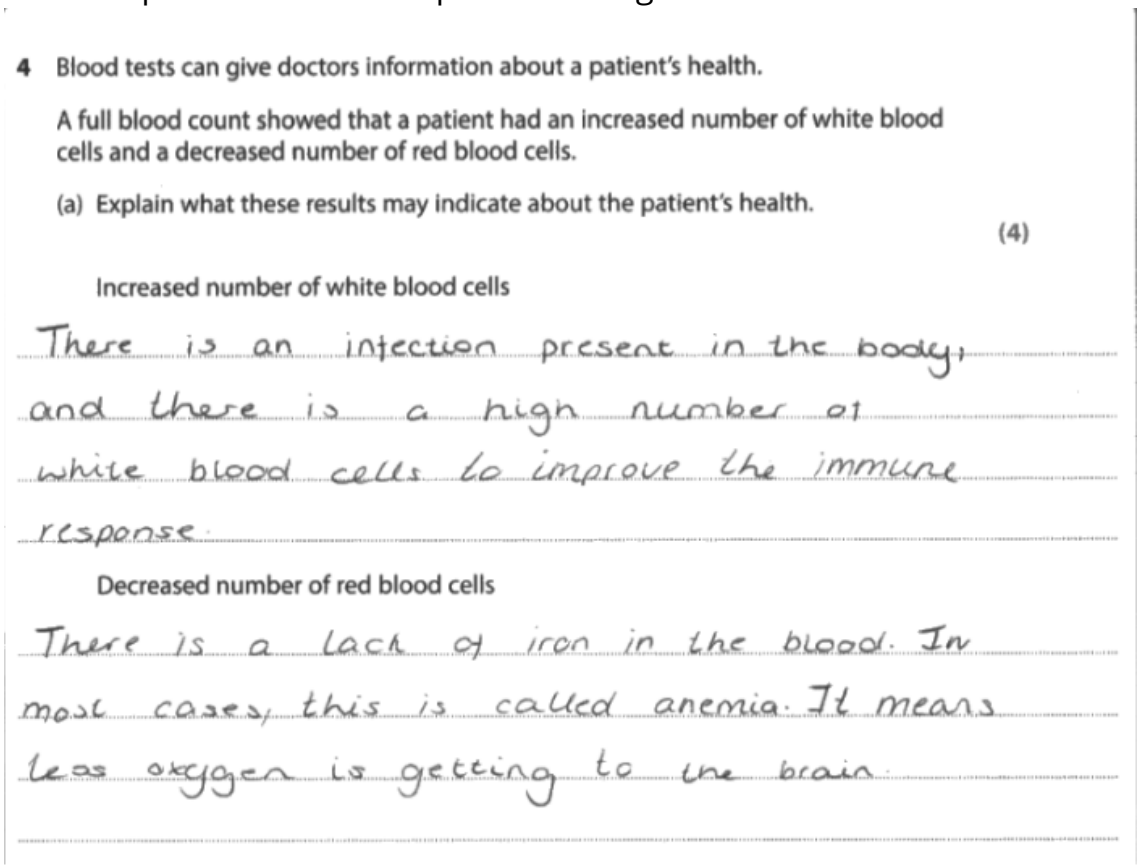
Increasing number of white blood cells can mean they have recently had a cold or an infection which the white blood cells are still fighting off

Decreased number of red blood cells

white blood cells are trying to fight infection so red blood cells have decreased

Here the learner has correctly identified the role of white blood cells in fighting an infection which gained 1 mark but there is no link to an increase in production or mention of the immune response to act as an expansion. The section of the response concerning red blood cells demonstrates a common misconception that increase in white blood cells leads to a decrease in red blood cells.

An example of a learner response scoring full marks is below:



4 Blood tests can give doctors information about a patient's health.

A full blood count showed that a patient had an increased number of white blood cells and a decreased number of red blood cells.

(a) Explain what these results may indicate about the patient's health.

(4)

Increased number of white blood cells

There is an infection present in the body, and there is a high number of white blood cells to improve the immune response.

Decreased number of red blood cells

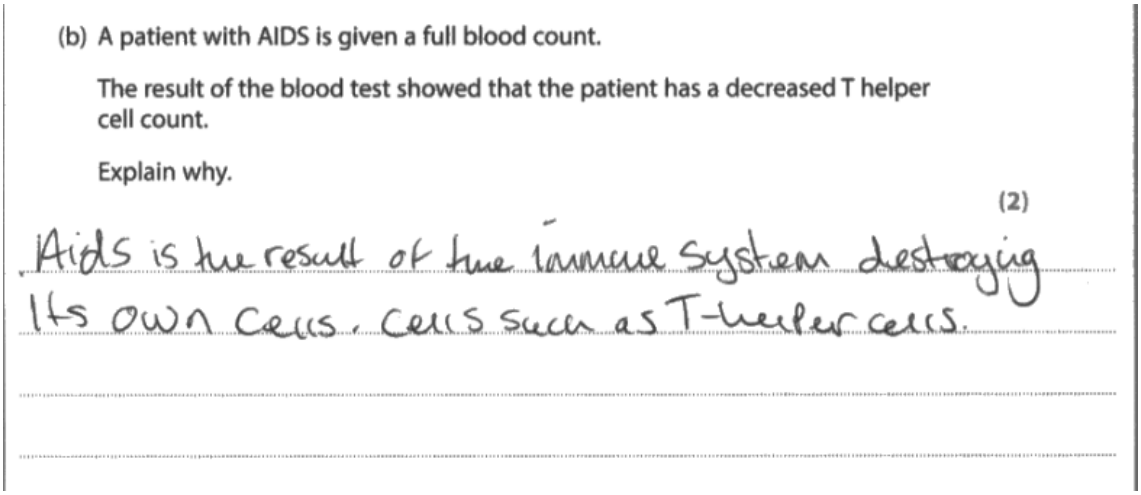
There is a lack of iron in the blood. In most cases, this is called anemia. It means less oxygen is getting to the brain.

Here the learner has identified presence of an infection and correctly expanded on this with the idea of the immune response. The suggestion of lack of iron/anaemia was the most common identification seen for the decreased number of red blood cells – very few learners suggested blood loss due to injury as a potential reason. The consequence of less oxygen available is seen here as a correct expansion; the idea that red blood cell production would decrease was almost entirely absent from learner responses – all together this response is given 4 marks.

Question 4b

This question was not answered correctly by most learners. This area of the specification has been assessed on several papers and it appears the link between HIV infection and AIDS is still not well understood by many learners.

A common misconception, that AIDS is an autoimmune disease, seen in previous papers continues to persist. An example of a response demonstrating this is below:



(b) A patient with AIDS is given a full blood count.

The result of the blood test showed that the patient has a decreased T helper cell count.

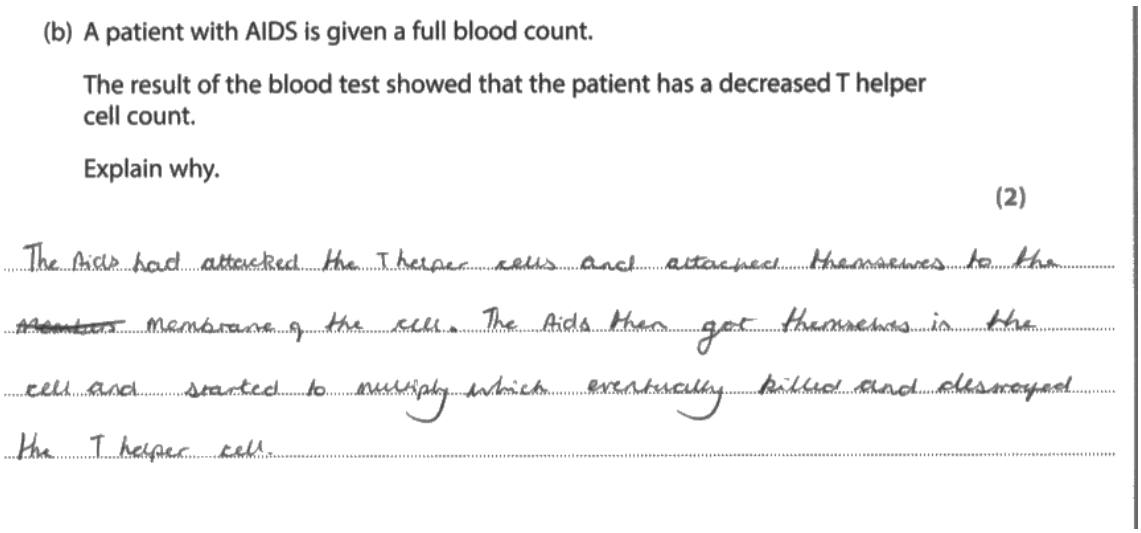
Explain why.

(2)

Aids is the result of the immune system destroying its own cells, cells such as T-helper cells.

This response scored 0 marks. The link between AIDS and the immune system is recognised by most learners but not in the correct context.

Another common learner misconception is that AIDS is a pathogen. An example of a response scoring 1 mark is seen below:



(b) A patient with AIDS is given a full blood count.

The result of the blood test showed that the patient has a decreased T helper cell count.

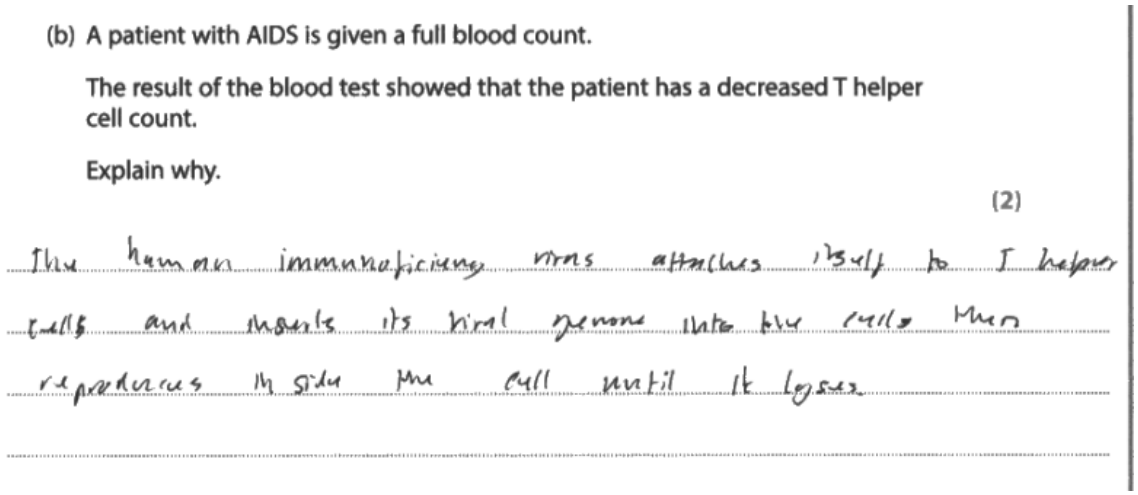
Explain why.

(2)

The Aids had attacked the T helper cells and attached themselves to the ~~Member~~ membrane of the cell. The Aids then got themselves in the cell and started to multiply which eventually killed and destroyed the T helper cell.

This learner describes AIDS attacking T helper cells, rather than recognising that the cells are infected with HIV. They do show an understanding that multiplication of the virus leads to destruction of T Helper cells, for which they are given credit, scoring 1 mark in total.

An example of a learner response scoring both marks is below:



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Explain why.

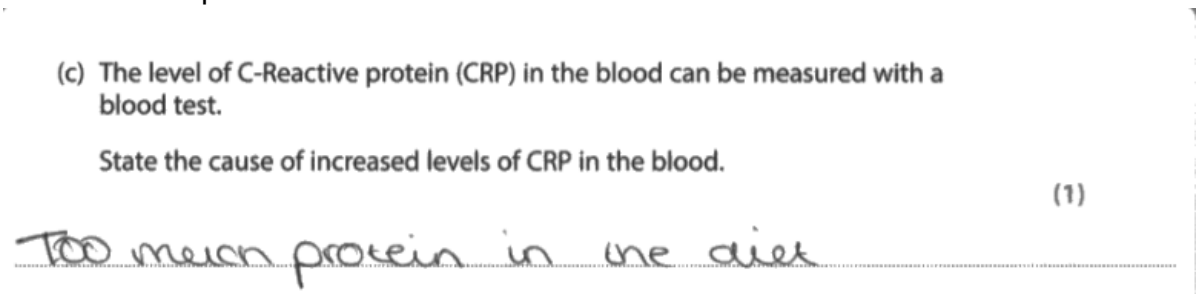
(2)

The human immunodeficiency virus attaches itself to T helper cells and inserts its viral genome into the cells then reproduces inside the cell until it bursts.

This response gives an excellent explanation of how HIV infects T helper cells and leads to their destruction.

Question 4c

Most learners did not score a mark on this question. A common incorrect response can be seen below:



(c) The level of C-Reactive protein (CRP) in the blood can be measured with a blood test.

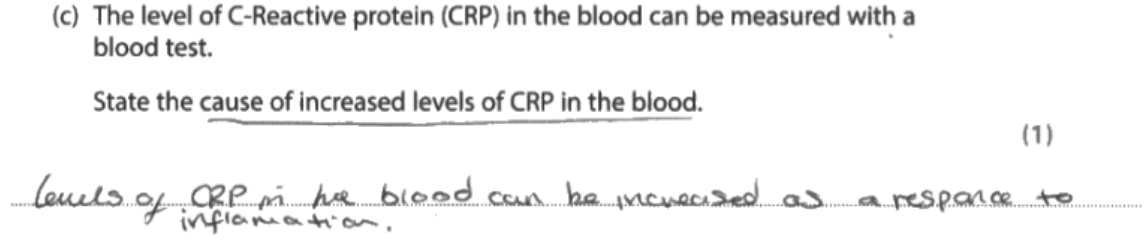
State the cause of increased levels of CRP in the blood.

(1)

Too much protein in the diet

In many cases learners focused on the word “protein” and linked increased levels of CRP to dietary causes or digestive issues. The presence of CRP as an indication of inflammation was generally not well understood by most learners.

An example of a correct response is seen below:



(c) The level of C-Reactive protein (CRP) in the blood can be measured with a blood test.

State the cause of increased levels of CRP in the blood.

(1)

Levels of CRP in the blood can be increased as a response to inflamation.

This scored 1 mark. More common than the expected phrasing, as seen above, were references to injury or named causes of inflammation such as infection, diabetes or obesity.

Question 4d

Most learners answered this question correctly. An example of a response which scored 1 mark can be seen below:

(d) Nurses wear gloves when taking a blood sample from a patient.

Give **one other** safety precaution that should be used.

(1)

Sterilized needles and tubes to prevent infection.

(Total for Question 4 = 8 marks)

The idea of sterilisation was well understood, and many learners gave responses in the context of using fresh needles for each patient. The idea of thorough hand washing before and after wearing the gloves was also seen very often.

Responses around PPE were common with many learners stating that the nurse should wear a mask. In some cases, responses along these lines became vague and instead of giving precautions appropriate in a health care setting became more related to standard health and safety for experiments in an education setting.

An example of a response which did not score a mark can be seen below:

(d) Nurses wear gloves when taking a blood sample from a patient.

Give **one other** safety precaution that should be used.

(1)

make sure their hair is tied up.

(Total for Question 4 = 8 marks)

This was awarded 0 marks as it is too generic to be given credit. Other responses along these lines included wearing goggles, tucking chairs under benches etc.

Question 5ai

Many learners were able to correctly name the stage of the cell cycle from the diagram given in the question. An example of a correct learner response is shown below:

(i) Name the stage of the cell cycle labelled **Y** in Figure 2.

(1)

S phase

This response scored 1 mark. Some learners gave the name of the phase as “synthesis”, this was also correct and given credit.

In some cases, the mark could not be awarded because the stages shown in the cell cycle were confused with those of nuclear division and stages of mitosis were named.

Another common incorrect response can be seen below. This response scored 0 marks.

(i) Name the stage of the cell cycle labelled **Y** in Figure 2.

(1)

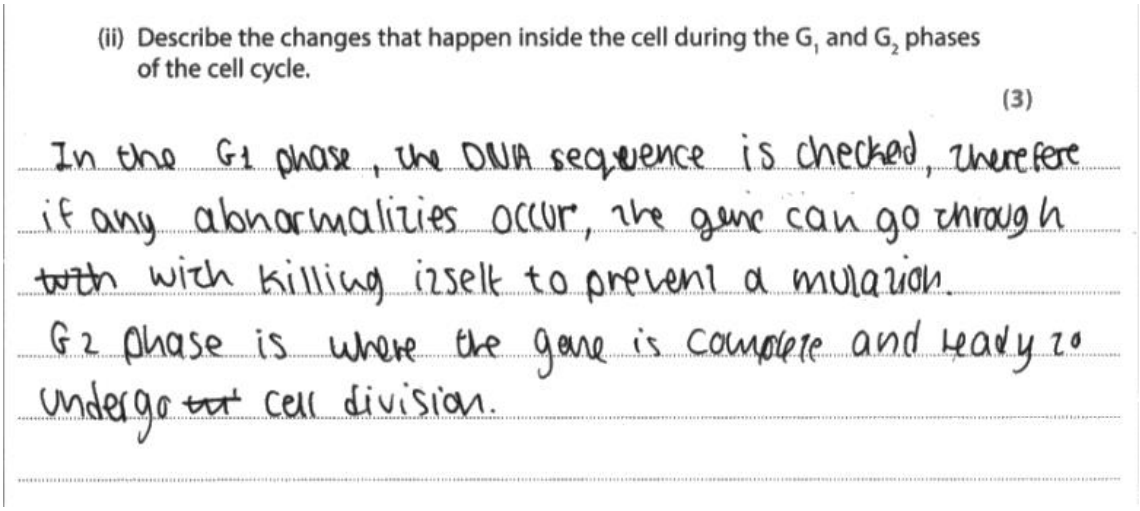
M phase

Question 5aii

This question proved challenging in many cases, with many learners confusing the cell cycle as a whole with the process of nuclear division. Responses which described movement chromosomes, chromatids being pulled apart by spindle fibres etc were common. As were responses referencing synthesis of DNA.

The idea of checkpoints was one seen in many responses, although often this was too vague to be given credit where learners referred to the cell being “checked to see if everything is OK” which didn’t provide sufficient detail to demonstrate understanding.

An example of a learner response where credit was given for this idea is seen below:



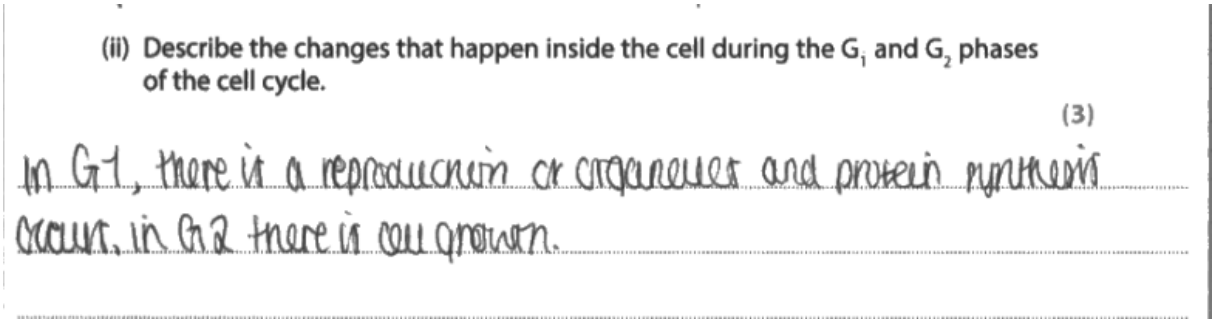
(ii) Describe the changes that happen inside the cell during the G_1 and G_2 phases of the cell cycle.

(3)

In the G1 phase, the DNA sequence is checked, therefore if any abnormalities occur, the gene can go through ~~with~~ with killing itself to prevent a mutation. G2 phase is where the gene is complete and ready to undergo ~~to~~ cell division.

Here, because the learner has been specific and referred to the DNA sequence being checked, a mark could be given. The second part of the response about being ready to undergo cell division is not sufficiently detailed for a mark so this scored a total of 1 mark only.

There were also some excellent responses. One example of a learner response scoring full marks can be seen below.



(ii) Describe the changes that happen inside the cell during the G_1 and G_2 phases of the cell cycle.

(3)

In G1, there is a reproduction of organelles and protein synthesis occur. in G2 there is cell growth.

This learner has stated which changes happen in G1 and in G2 although that was not needed for this question, as there is only one answer space learners were able to discuss both phases together and did not need to differentiate between them for full marks. This response was given 3 marks.

As both stages were discussed together the idea of cell growth could only be credited once, in many cases learners repeated this marking point twice, as seen in the example below:

(ii) Describe the changes that happen inside the cell during the G_1 and G_2 phases of the cell cycle.

(3)

In G_1 the cell increases in size and also increases the amount of organelles in G_2 the size of cell increases again and the cell prepares for cell division and cytokinesis

This response was given 2 marks – 1 mark for the idea of the cell increasing in size and 1 mark for the description of the increase in number of organelles. The mention of growth in G2 could not be credited as this marking point had already been awarded.

Question 5bi

This question was not answered correctly by the vast majority of learners. An example of a correct response can be seen below.

(b) Spindle fibres have an important function in nuclear division.

(i) Name the organelle that produces spindle fibres.

(1)

centrioles

This was given 1 mark. The alternative answer of "centrosome" was seen less frequently.

Incorrect responses often gave an answer that was very close to the correct term but was confused with another similar sounding key word from the same topic. An example can be seen below:

(b) Spindle fibres have an important function in nuclear division.

(i) Name the organelle that produces spindle fibres.

(1)

Centromeres.

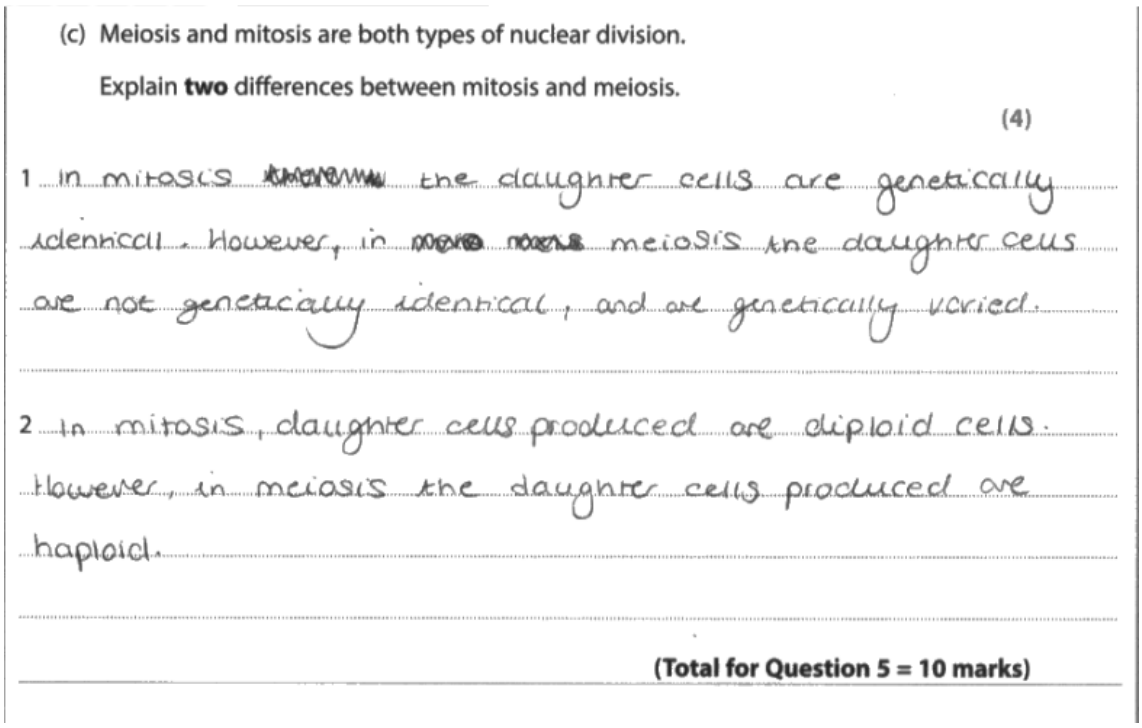
This was a very common incorrect response, which was understandable. Also seen frequently were other named organelles associated with the cell cycle such as nucleus and ribosome as well as "chromosome" and "chromatid", again as similar sounding key terms from the same topic.

Question 5bii

Around half of responses from learners correctly identified anaphase as the stage of mitosis in which the sister chromatids are pulled apart by spindle fibres.

Question 5c

This question was answered well, with most learners scoring at least 1 of the 4 marks available. Where learners lost marks, it was often because they did not structure their response as an explanation, giving an identification and expansion for each difference. Instead, learners gave a statement about one form of nuclear division and then a reverse argument for the other form. An example of this type of response can be seen below:



(c) Meiosis and mitosis are both types of nuclear division.

Explain **two** differences between mitosis and meiosis.

(4)

1 In mitosis the daughter cells are genetically identical. However, in meiosis the daughter cells are not genetically identical, and are genetically varied.

2 In mitosis, daughter cells produced are diploid cells. However, in meiosis the daughter cells produced are haploid.

(Total for Question 5 = 10 marks)

Here the learner has scored 2 identification marks, 1 for each difference. The learner did not go onto expand on either one so no further marks can be awarded.

The key ideas surrounding mitosis and meiosis were generally understood, although most responses contained lists of features and formed more of a description – often these points could be taken holistically to form two complete explanations as the features listed acted as explanations for one another – e.g. the idea that meiosis produces gametes linked to the idea that the daughter cells from meiosis are haploid. Although learner responses were only rarely structured as complete explanations there were some very strong examples seen as below:

(c) Meiosis and mitosis are both types of nuclear division.

Explain **two** differences between mitosis and meiosis.

(4)

1 mitosis involves ~~xxxx~~ one division so therefore produces 2 new cells whereas meiosis involves two divisions so four new cells are produced.

~~xxxx~~

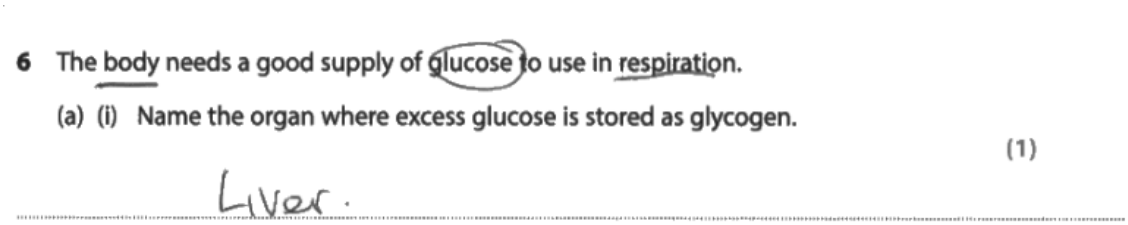
2 mitosis will create genetically ~~identical~~ identical cells with a complete pair of chromosomes and these are somatic body cells. Whereas meiosis produces cells with genetic variation so they're different from eachother and only have half the number of chromesomes. These are sex gameres.

(Total for Question 5 = 10 marks)

This response was awarded all 4 marks. Both differences have been explained and there are clear lines of argument in the learner's response.

Question 6ai

This question was answered correctly by around one third of learners. An example of a correct learner response is shown below:


6 The body needs a good supply of glucose to use in respiration.

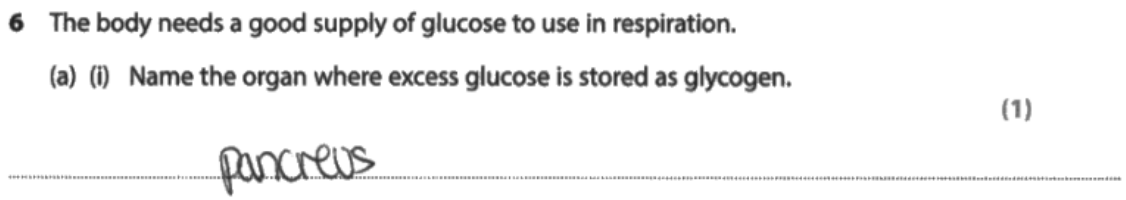
(a) (i) Name the organ where excess glucose is stored as glycogen.

(1)

Liver.

This response scored 1 mark. The idea of glycogen stores found in the muscles would have also been acceptable for a mark, but this was rarely seen in learner responses.

The single most common incorrect learner response to this question can be seen below:


6 The body needs a good supply of glucose to use in respiration.

(a) (i) Name the organ where excess glucose is stored as glycogen.

(1)

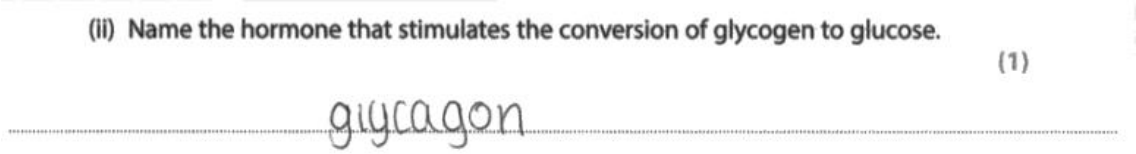
pancreas

This was awarded 0 marks; learners understand that the pancreas has a role in the control of blood glucose level but this is not the correct context.

Question 6aii

Similar to question 5bi, learners found 6aii challenging due to the number of similar sounding and spelled key terms within this topic. Learner responses combining key terms were common and unfortunately these were too ambiguous to be given credit.

A common incorrect response of this kind can be seen below.


(ii) Name the hormone that stimulates the conversion of glycogen to glucose.

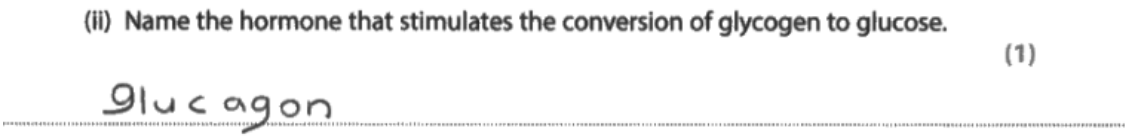
(1)

glycagon

Unfortunately, this response is too close to the word “glycogen” from the stem to be given benefit of the doubt for a phonetic spelling of the correct answer. This is a rare example as phonetic spellings are usually given credit as long as there is no ambiguity.

The response “insulin” was the most common incorrect answer to this question. Similar to the example in question 6ai - learners clearly understand the link between insulin and control of blood glucose levels but do not have it in the correct context for this question.

An example of a correct response can be seen below. This was awarded 1 mark.


(ii) Name the hormone that stimulates the conversion of glycogen to glucose.

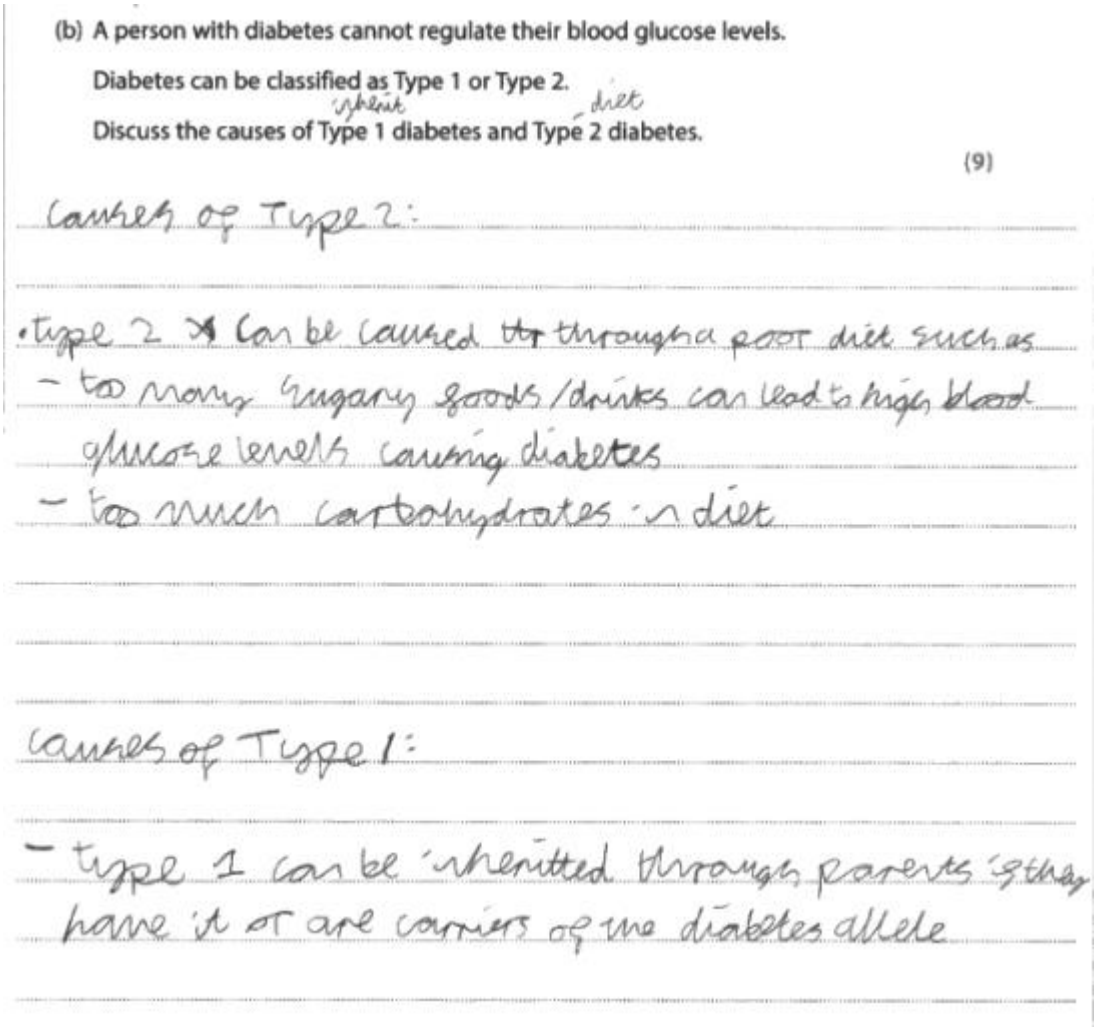
(1)

Glucagon

Question 6b

This question allowed for a wide range of responses, in many cases good knowledge and understanding could be demonstrated by learners although in some examples there was an inability to correctly apply the context of the question. Answers focused on treatments for diabetes rather than discussing the potential causes. Across responses at all levels, the causes of Type 1 diabetes were much better understood than those of Type 2 diabetes.

An example of a Level 1 response can be seen below:



(b) A person with diabetes cannot regulate their blood glucose levels.

Diabetes can be classified as Type 1 or Type 2.

Discuss the causes of Type 1 diabetes and Type 2 diabetes.

(9)

Causes of Type 2:

- Type 2 can be caused through a poor diet such as
  - too many sugary foods/drinks can lead to high blood glucose levels causing diabetes
  - too much carbohydrates in diet

Causes of Type 1:

- Type 1 can be inherited through parents if they have it or are carriers of the diabetes allele

This is an example of a Level 1 response, the learner has identified diet as a cause for Type 2 diabetes and genetics as a cause for Type 1 diabetes, these are simple statements and class as isolated pieces of knowledge. The idea of dietary causes for Type 2 diabetes is seen at all three levels and is rarely developed on beyond quite superficial commentary outside of the absolute strongest responses. The roles of both insulin and the pancreas are absent in this response, demonstrating a limited discussion as this is a major omission. Limited discussion and isolated elements of knowledge and understanding place this response in Level 1.

Level 2 responses included some appreciation of the role that both insulin and the pancreas play in the regulation of blood glucose levels. Responses at this level often focused on the treatment of diabetes,

rather than the causes. Learners appear to have a better understanding of the treatment of diabetes than the causes.

An example of a Level 2 response can be seen below:

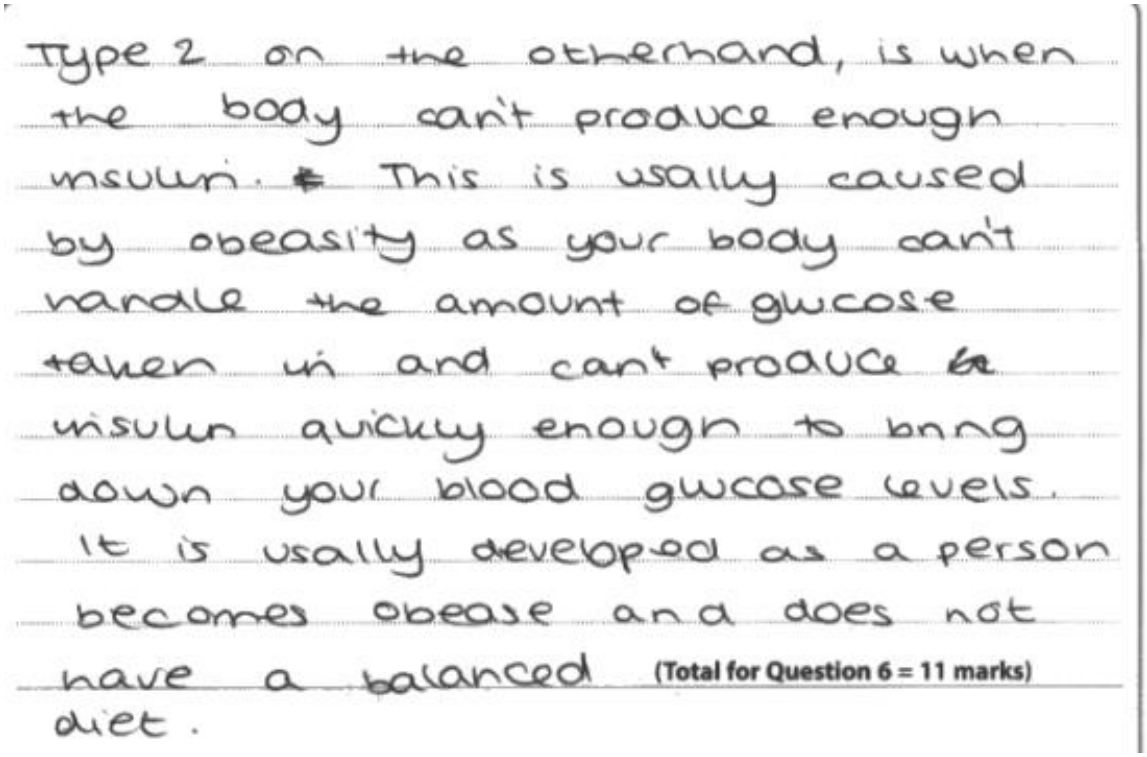
(b) A person with diabetes cannot regulate their blood glucose levels.

Diabetes can be classified as Type 1 or Type 2.

Discuss the causes of Type 1 diabetes and Type 2 diabetes.

(9)

Type 1 diabetes is where your body can't produce insulin in the pancreas so cannot regulate their gucose levels. Type 1 is an innate disease that someone has for ~~there~~ their whole life. Type one is usally caused by a mutation in the DNA coding, ~~for~~ that stops the pancreas from producing and secreting insulin. As a substitution diabetics inject ~~glucose~~ insulin when their blood sugar levels get too high.



Type 2 on the otherhand, is when the body can't produce enough insulin. This is usally caused by obeasity as your body can't handle the amount of glucose taken in and can't produce the insulin quicky enough to bring down your blood glucose levels. It is usally developed as a person becomes obease and does not have a balanced diet.

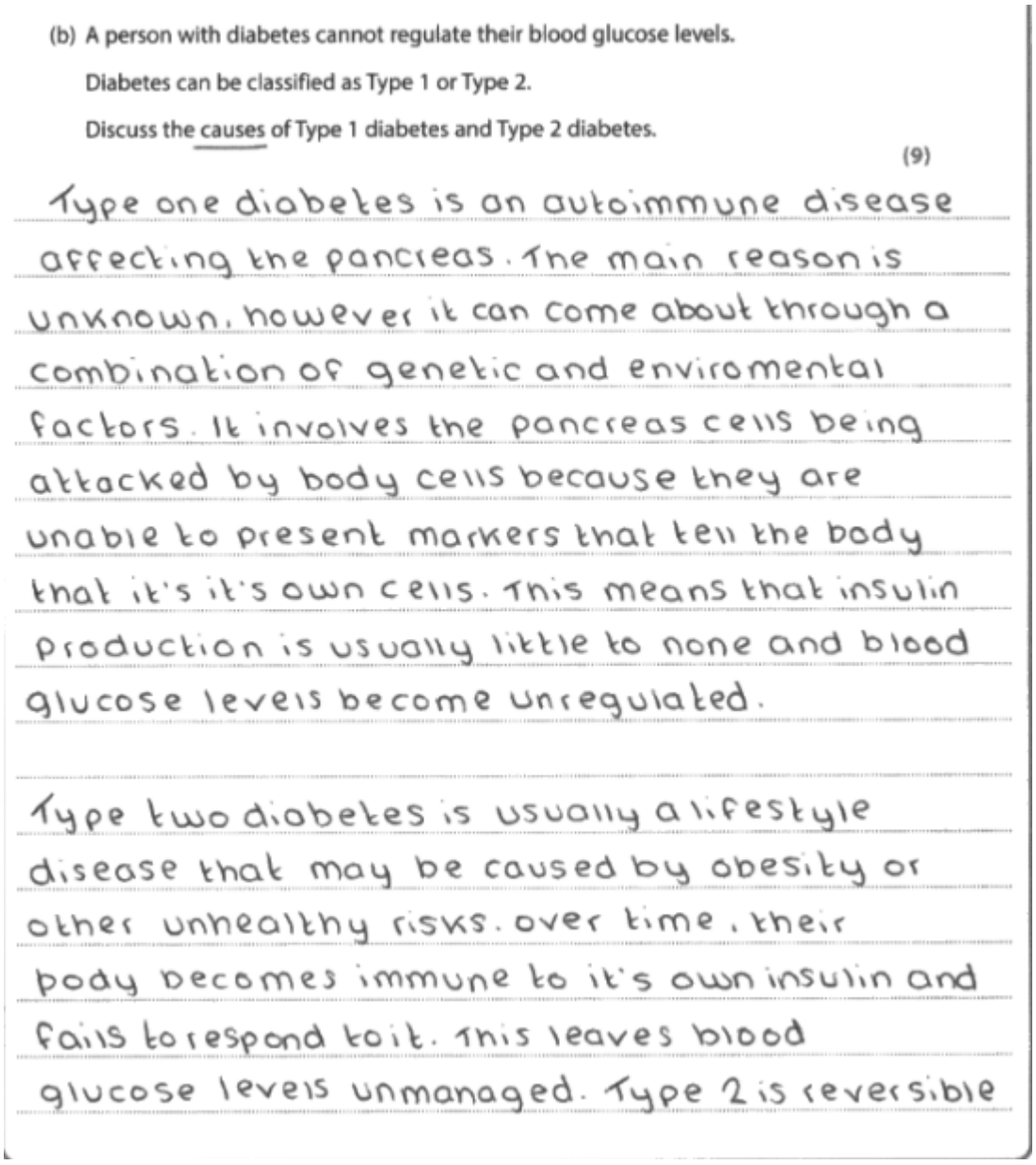
(Total for Question 6 = 11 marks)

This response is a more developed discussion than the previous example from Level 1, although it is still missing some key details. The learner has made the connection between Type 1 diabetes and lack of insulin production by the pancreas but has not followed the line of argument through to its fullest by discussing the autoimmune element of Type 1 diabetes – this is seen primarily in responses scoring marks in Level 3 as it represents a more detailed level of understanding. The learner has linked the idea of development of Type 1 diabetes with the idea of a genetic cause, ideas about a diabetes allele were seen quite frequently in responses at this level.

The learner is not as clear on their understanding of Type 2 diabetes and gives generic responses about consumption of sugar and obesity. There is a brief comment about high blood sugar levels, but this is not correctly expanded upon. Despite the response being weaker on the causes of Type 2 diabetes the learner has still demonstrated a partially developed discussion considering the causes of both types of diabetes - this places the response in Level 2.

The strongest responses were more nuanced when discussing the causes of Type 1 and Type 2 diabetes. Rather than a definitive statement about direct genetic causes due to a specific allele there was an indication that learners understood the concept of an increased risk due to genetic factors. The mechanisms behind lack of insulin production in Type 1 diabetes were also explained in more detail.

Below is an example of a response which scored a mark in Level 3.



(b) A person with diabetes cannot regulate their blood glucose levels.

Diabetes can be classified as Type 1 or Type 2.

Discuss the causes of Type 1 diabetes and Type 2 diabetes.

(9)

Type one diabetes is an autoimmune disease affecting the pancreas. The main reason is unknown, however it can come about through a combination of genetic and enviromental factors. It involves the pancreas cells being attacked by body cells because they are unable to present markers that tell the body that it's it's own cells. This means that insulin production is usually little to none and blood glucose levels become unregulated.

Type two diabetes is usually a lifestyle disease that may be caused by obesity or other unhealthy risks. over time, their body becomes immune to it's own insulin and fails to respond to it. This leaves blood glucose levels unmanaged. Type 2 is reversible

This response describes the autoimmune causes of Type 1 diabetes. Although this could be developed further and could include more detail, this does indicate a more detailed level of knowledge and understanding of the topic. Again, the causes of Type 2 diabetes are

less clearly explained but here there is the additional detail about insulin resistance, again demonstrating a more detailed understanding. With the consideration of both genetic and environmental factors causing Type 1 diabetes there is an appreciation of how different, interrelated, aspects of the topic are linked together. This means the response, although quite brief, meets the threshold for a mark in Level 3.

Question 7a

The calculation question was well answered with many responses scoring full marks. An example of a response awarded 3 marks can be seen below:

7 Nerves transmit impulses around the body.

Nerve conduction velocity (NCV) is the speed at which impulses travel.

(a) A change in a person's NCV may indicate a problem in the nervous system.

Table 2 shows the results from **two** NCV tests from the same person, taken one year apart.

year	NCV (m/s)
2019	57
2020	42

Table 2

Calculate the percentage decrease in the person's NCV.

(3)

42 ÷ 57 = Ans

Ans × 100 = 73.68

100 - 73.68 = 26.32

percentage decrease = 26.32 %

Here the learner has correctly calculated 42 as a percentage of 57 and then has subtracted this from 100 to give the percentage decrease – this was given as an alternative method on the mark scheme and is therefore awarded 3 marks for the correct answer.

Where learners did not score full marks, the majority of responses were awarded at least 1 mark as shown in the example below.

7 Nerves transmit impulses around the body.

Nerve conduction velocity (NCV) is the speed at which impulses travel.

(a) A change in a person's NCV may indicate a problem in the nervous system.

Table 2 shows the results from **two** NCV tests from the same person, taken one year apart.

year	NCV (m/s)
2019	57
2020	42

Table 2

Calculate the percentage decrease in the person's NCV. (3)

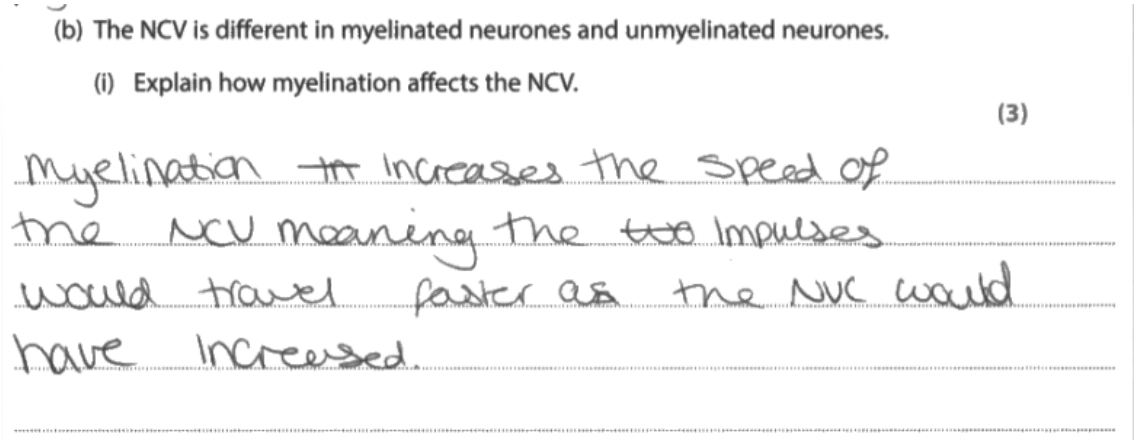
57 - 42 = 15
57 ÷ 100 = 0.57
0.57 × 15 = 8.55

percentage decrease = 8.55 %

This response was given 1 mark, although the learner has not correctly calculated the percentage decrease in NCV they have worked out the difference between the two values for NCV from the data provided in Table 2 and have been awarded the first marking point.

Question 7bi

The first marking point was the most frequently awarded for this question. An example of a learner response scoring 1 mark is shown below:



(b) The NCV is different in myelinated neurones and unmyelinated neurones.

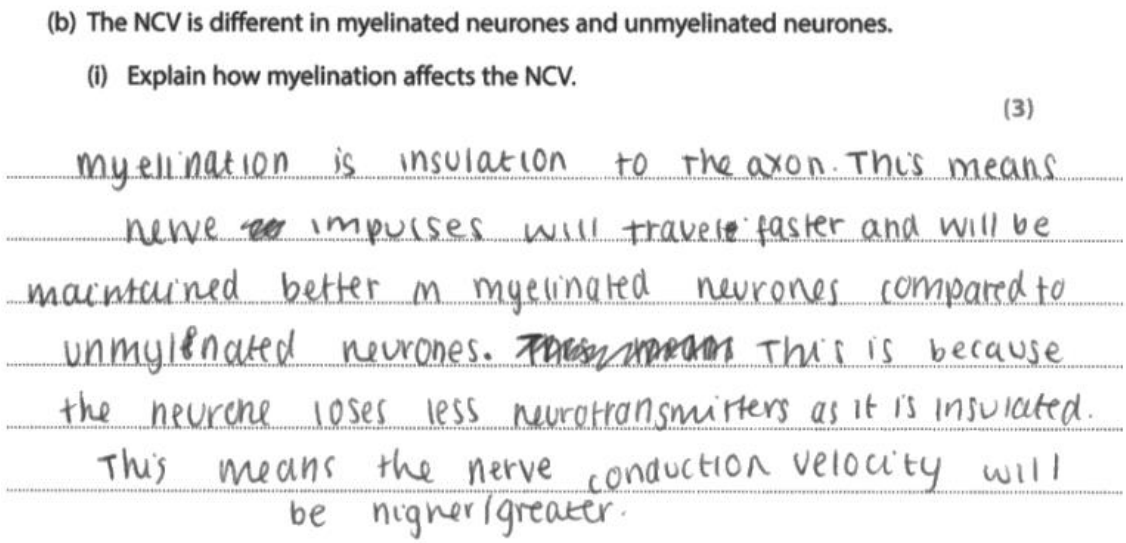
(i) Explain how myelination affects the NCV.

(3)

Myelination ~~is~~ increases the speed of the NCV meaning the ~~the~~ impulses would travel faster as the NVC would have increased.

Here the learner has correctly identified that myelinated neurones have a faster NCV than unmyelinated neurones, however they have not correctly expanded on this and so only 1 mark is awarded.

Where learners scored 2 marks the expansion given was usually in terms of insulation by the myelin sheath. An example of a response scoring 2 marks is below:



(b) The NCV is different in myelinated neurones and unmyelinated neurones.

(i) Explain how myelination affects the NCV.

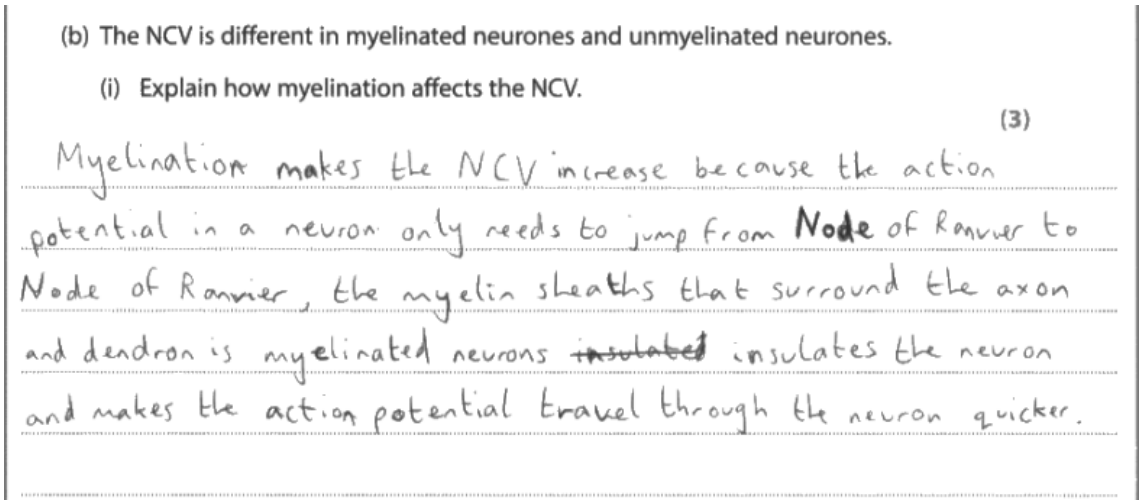
(3)

myelination is insulation to the axon. This means nerve ~~or~~ impulses will travele faster and will be maintained better in myelinated neurones compared to unmylinated neurones. ~~This means~~ This is because the neurone loses less neurotransmitters as it is insulated. This means the nerve conduction velocity will be higher/greater.

In most responses stating that the myelin sheath acts as insulation, learners incorrectly linked this to heat energy loss, as in electrical wiring. The response above could have achieved a third marking point,

but as it references loss of neurotransmitters rather than ions, only 2 marks can be awarded.

An example of a learner response given full marks can be seen below:



(b) The NCV is different in myelinated neurones and unmyelinated neurones.

(i) Explain how myelination affects the NCV.

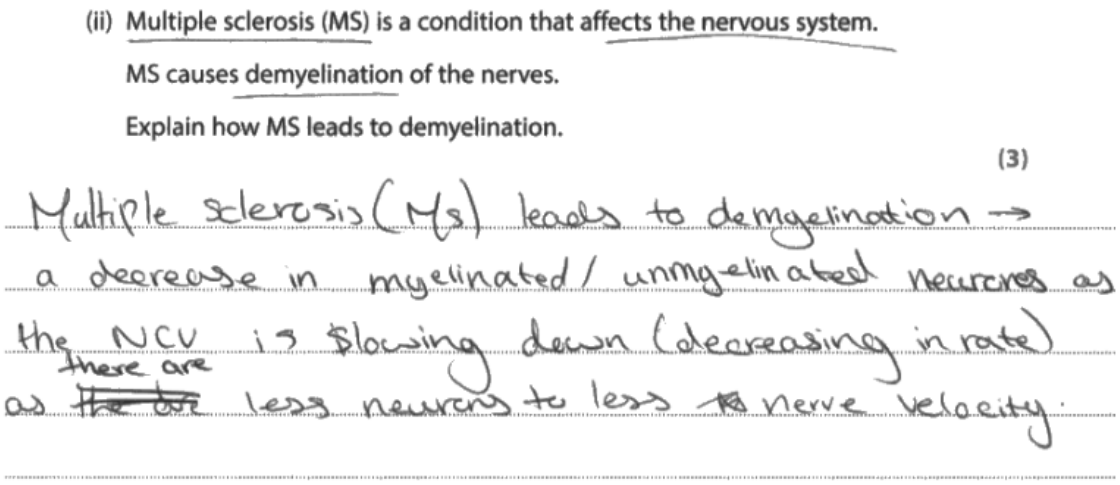
(3)

Myelination makes the NCV increase because the action potential in a neuron only needs to jump from Node of Ranvier to Node of Ranvier, the myelin sheaths that surround the axon and dendron is myelinated neurons ~~insulated~~ insulates the neuron and makes the action potential travel through the neuron quicker.

Here the learner has referenced insulation but has also described saltatory conduction with their statement that the action potential jumps between nodes of Ranvier. This was awarded 3 marks.

Question 7bii

This question was challenging for most learners, with only a small number of responses scoring marks. Among incorrect responses, the idea that decreased NCV leads to loss of the myelin sheath were common, as seen below.



(ii) Multiple sclerosis (MS) is a condition that affects the nervous system.

MS causes demyelination of the nerves.

Explain how MS leads to demyelination.

(3)

Multiple sclerosis (MS) leads to demyelination → a decrease in myelinated / unmyelinated neurones as the NCV is slowing down (decreasing in rate) as ~~the are~~ there are less neurons to less ~~to~~ nerve velocity.

This response scored 0 marks as cause and effect have been confused with each other.

Responses which scored marks most frequently described the breakdown of the myelin sheath. An example of a response scoring 2 marks is as follows:

(ii) Multiple sclerosis (MS) is a condition that affects the nervous system.

MS causes demyelination of the nerves.

Explain how MS leads to demyelination.

(3)

Because when a person has multiple sclerosis, the body attacks the myelinated sheath of nerve cells. This causes them to break down meaning that nerve impulses will be delayed or disrupted due to the impulse not being able to jump from node of ranvier to node of ranvier.

Here the learner has been given 2 marks for the idea of the myelin sheath being attacked and for the idea of this leading to the break down of the myelin. However, they have missed out on the third mark because of the lack of specificity in their response. The idea of the body attacking its own cells is not sufficient for credit when discussing autoimmune conditions, learners must be clear that it is the immune system which attacks the cells.

A response where this is done very well can be seen below.

(ii) Multiple sclerosis (MS) is a condition that affects the nervous system.

MS causes demyelination of the nerves.

Explain how MS leads to demyelination.

(3)

multiple sclerosis causes the bodys immune system to attack the myelin sheath on the neurones. If the immune system attacks the myelin sheath it leaves it damaged and can also leave the neurone without any at all. this causes slower impulses as the myelin sheath is not there to insulate the neurone.

This response was given 3 marks for a correct explanation of the autoimmune causes of demyelination in MS.

Question 7ci

Most learners scored at least 1 or more mark on this question, although there were some responses which did not gain credit. An example of a response which did not gain any marks can be seen below:

(c) (i) Another way of assessing nerve function is to use a reflex test.

One reflex test involves tapping a tendon in a patient's knee.

Describe the pathway taken by the impulse during the reflex test.

(4)

In this reflex test the impulse would travel through the Patients knee and find the fastest route through the CNS. The impulse could travel from the knee to the spinal chord and then up to the brain where the Signals ~~reflex~~ of the Patients knee kicking out ~~[redacted]~~ as a reflex would ~~[redacted]~~ be sent back from to occur.

Many learners incorrectly stated that the impulse travels to the brain during this reflex arc, as is seen in this response. This is a direct contradiction to the marking point which states the impulse travels through the spinal cord only. Therefore, no mark is given here. This response is not specific enough to meet any of the other marking points. Without reference to specific neurones, receptors or effectors there is not enough detail here. 0 marks awarded.

An example of a response awarded full marks can be seen below:

(c) (i) Another way of assessing nerve function is to use a reflex test.

One reflex test involves tapping a tendon in a patient's knee.

Describe the pathway taken by the impulse during the reflex test.

(4)

After a patient has had a tendon tapped in their knee it will create an ~~electrical impulse~~ message that will be detected by the ~~effector~~ receptor, this will then move to the sensory neurone, then the relay neurone, then the motor neurone, which then goes to the effector and leads to a response. This response is the knee jerking to the reflex test.

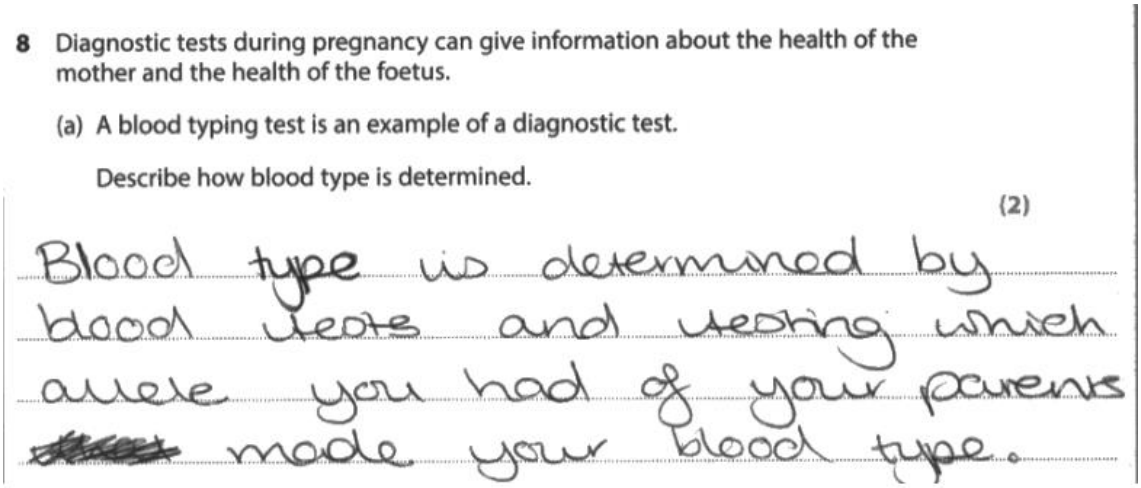
This response is typical of learner answers that were awarded 4 marks – the pathway of the reflex arc is clearly understood and given in the correct order, with details of both receptor at the start and effector at the end.

Question 7cii

This question was answered very well, with most learners correctly identifying that dilation of pupils in response to light was an example of a reflex response.

Question 8a

In many cases learners lost marks because they repeated the stem of the question by stating that blood type is determined by a blood test. An example of this can be seen below:



8 Diagnostic tests during pregnancy can give information about the health of the mother and the health of the foetus.

(a) A blood typing test is an example of a diagnostic test.

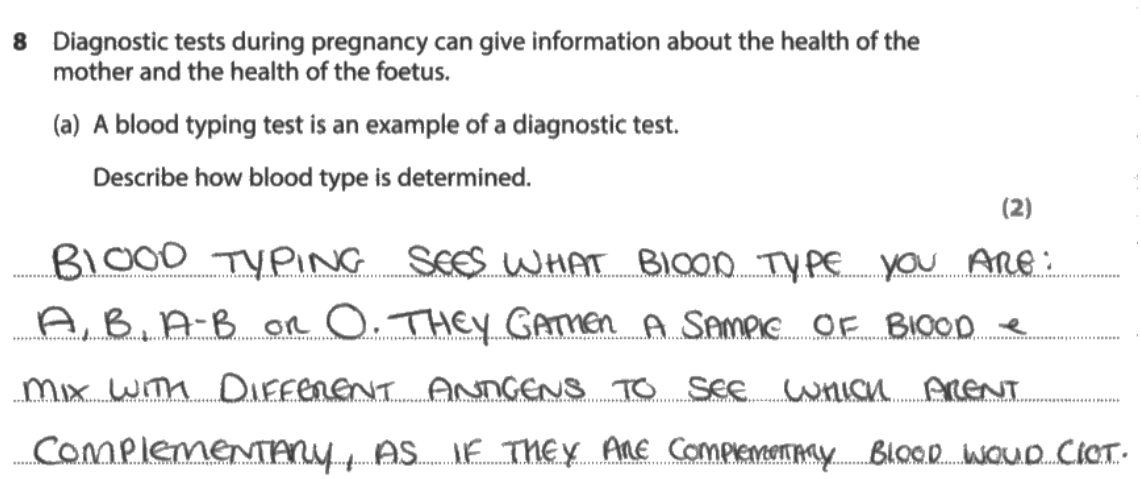
Describe how blood type is determined.

(2)

Blood type is determined by blood tests and testing which allele you had of your parents made your blood type.

This response was given 0 marks, the idea of identifying the allele for blood type was common in responses but not given any credit.

An example of a response scoring full marks is below:



8 Diagnostic tests during pregnancy can give information about the health of the mother and the health of the foetus.

(a) A blood typing test is an example of a diagnostic test.

Describe how blood type is determined.

(2)

BLOOD TYPING SEES WHAT BLOOD TYPE YOU ARE: A, B, A-B or O. THEY GATHER A SAMPLE OF BLOOD & MIX WITH DIFFERENT ANTIGENS TO SEE WHICH AREN'T COMPLEMENTARY, AS IF THEY ARE COMPLEMENTARY BLOOD WOULD CLOT.

Here the learner has been given 2 marks. The first mark is for the idea of a blood sample being taken.
In this response, antigens have been confused with antibodies and therefore cannot be awarded a mark for this idea, however the description of blood clots forming is just sufficient for the second mark.

Question 8b

This question was answered very well in some responses. An example of a response scoring full marks can be seen below:

(b) Table 3 shows the blood types of two parents and their child.

	blood type
mother	O
father	A
child	O

Table 3

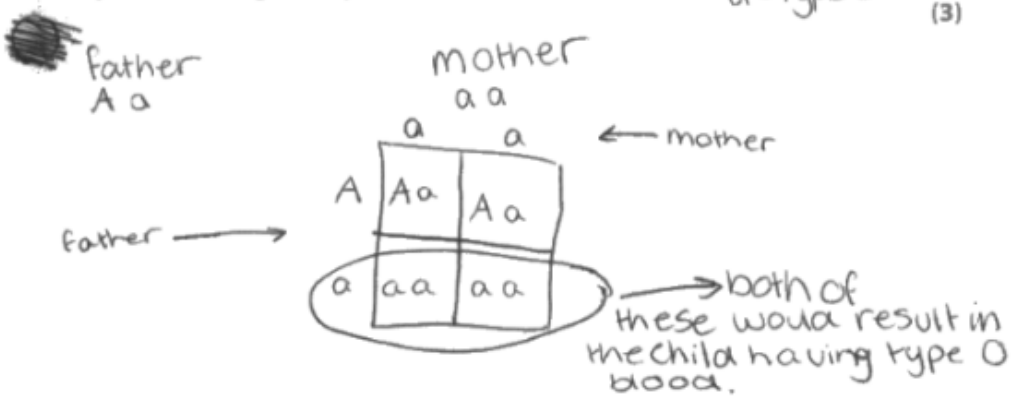
The allele for blood type O is recessive to the allele for blood type A.

Explain how their child inherited the O blood type.

You may include a diagram in your answer.

A = type A
a = type O

(3)



the recessive allele needs two of them to be dominant. There was a 50% chance of the child having type O blood.

Even though the learner has not used the conventional notation for the A and O alleles they have included a key with their response and labelled the genotype that would result in offspring with the O blood type. All 3 marks were awarded.

Many learners provided excellent responses but did not correctly label their diagrams or explain which of the genotypes shown would lead to the child having blood type O.

Some learners incorrectly drew the result of heterozygous genetic crosses, as seen in the example below:

(b) Table 3 shows the blood types of two parents and their child.

	blood type
mother	O
father	A
child	O

Table 3

The allele for blood type O is recessive to the allele for blood type A.

Explain how their child inherited the O blood type.

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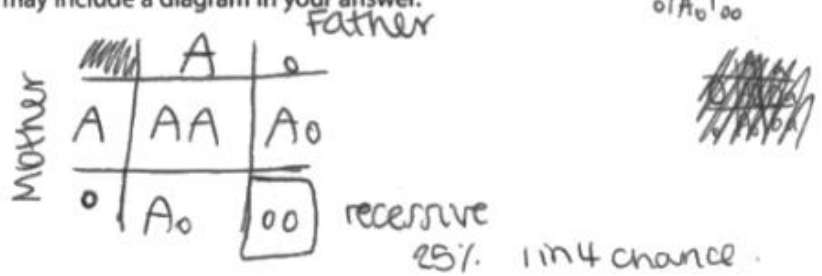
(3)



Child inherits from the recessive allele of O from mother and father.

This response scored 2 marks as the learner has correctly identified that the father must be heterozygous and has also stated that the child will be type O only if they inherit two copies of the recessive allele. This response misses out on the final marking point as the genotype of the mother has not been correctly identified. There is a small, correct, Punnett square diagram in the top right corner but this must be treated as rough working as the learner's response refers to the main diagram and cannot be given full credit.

In some cases, it was clear that the mechanism for inheritance of blood type was not well understood. There were examples of learners confusing this with sex linked inheritance as well as responses such as the one below:

(b) Table 3 shows the blood types of two parents and their child.

	blood type
mother	O
father	A
child	O

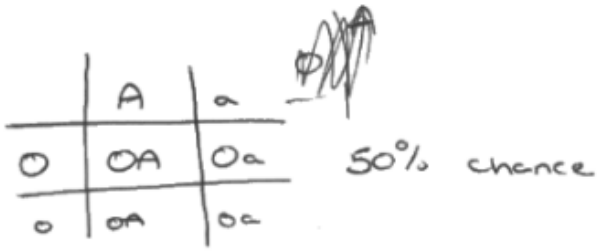
Table 3

The allele for blood type O is recessive to the allele for blood type A.

Explain how their child inherited the O blood type.

You may include a diagram in your answer.

(3)



The child inherited the blood type O due to the 50% chance of either getting blood type A

Here the learner's response demonstrates a lack of understanding about how the alleles for the different blood types are inherited – both are represented as heterozygous with different letters representing each – this response was awarded 0 marks.

Question 8c

In this question learners were given diagrams showing two different diagnostic tests which can be performed during pregnancy and were asked to evaluate their use. A variety of learner responses were seen, scoring a range of marks at all levels.

An example of a response scoring in Level 1 can be seen below:

The reasons for chorionic villus sampling is to monitor how the foetus is getting on and that nothing is unusual so no further action needs to be taken where the baby foetus could be at risk.

The process is done in the placenta where the catheter extracts tissue samples and uses ultrasound. Also this process is done at a very early stage.
The risks for chorionic villus sampling is that it uses ultrasound which there is always a risk of cancer. also the foetus is very underveloped so process is done very early on in pregnancy meaning the foetus is going to be very weak maybe indicating there is a risk of death in chorionic villus sampling.

The reason for amniocentesis is to inject amniotic fluid to help the foetus go through the final stages of pregnancy with the help of the amniotic fluid.

The process of amniocentesis is the injection of an amniotic fluid into the area surrounding the foetus using ultra sound near the end of the pregnancy.

The risks for amniocentesis is the use of ultra sound again which risks cancer, also a needle is being inserted into fluid part surrounding so there is a risk of infection if the needle is not clean. Finally the baby is quite far in the pregnancy stage so risk of further damage as its more advanced

(Total for Question 8 = 14 marks)

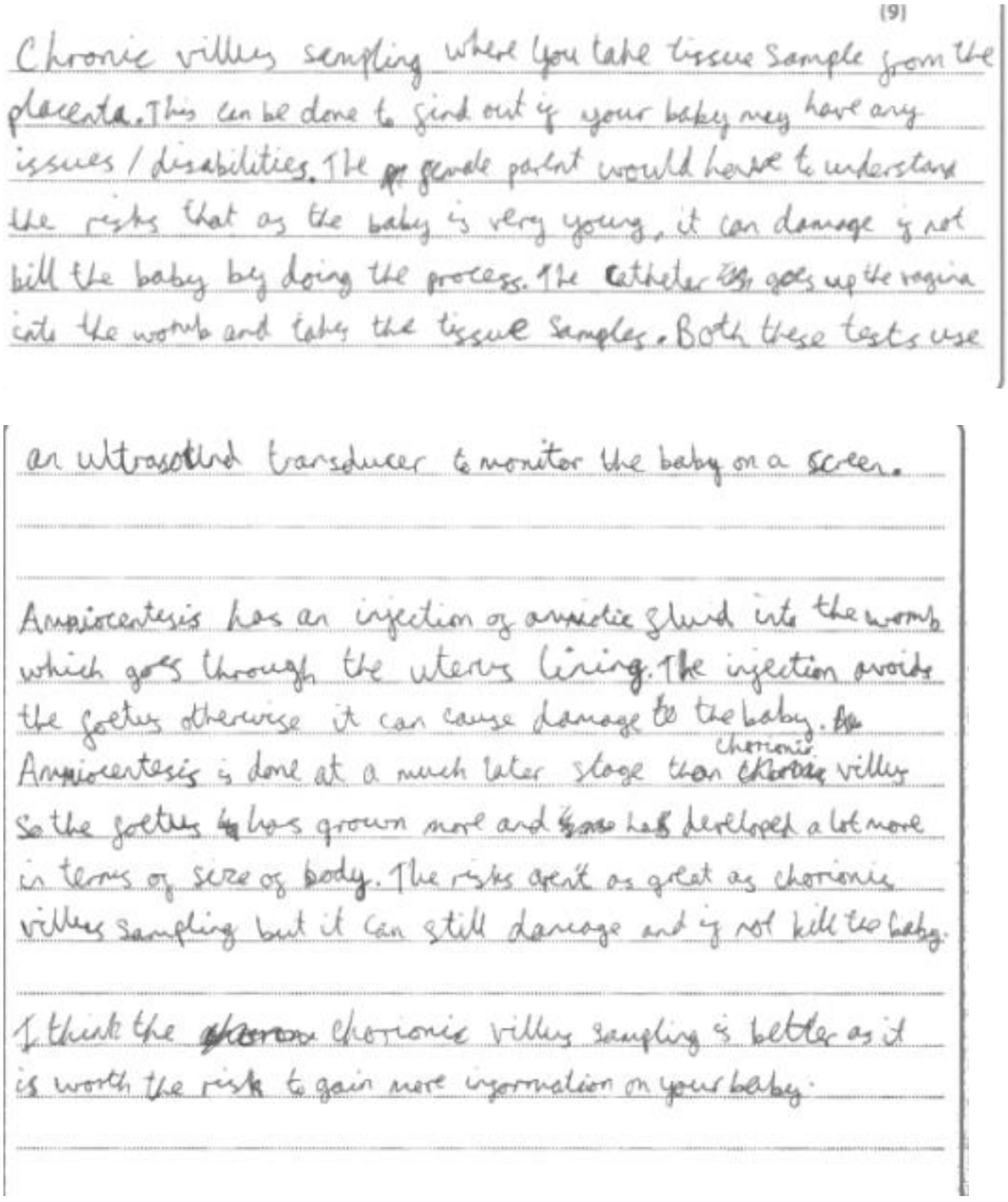
TOTAL FOR PAPER = 80 MARKS

Level 1 responses rarely showed an appreciation of the reasons for performing these diagnostic tests, reasons given were often vague along the lines of “to check if anything is wrong” or “to see if the placenta is working properly”. Responses were often primarily descriptive of the diagrams provided in the stem of the question in describing how the tests are carried out. The response above shows a common misconception seen in Level 1 responses, that the amniotic fluid is injected during amniocentesis rather than a sample being taken. Learners were able to interpret some details or bring in outside knowledge – this was usually related to the timing of the two tests. Learner responses in Level 1 often had an appreciation of risk although these were often either generic or incorrect – as seen in the example above with the statement that ultrasound creates a risk of cancer.

The response above demonstrates some isolated elements of understanding, with several inaccuracies. Evaluation is weak and comes almost entirely from the diagrams in the stem, based on generic ideas of harm caused by the tests – there is no indication of the risk being offset by benefits in terms of information which could be obtained from the testing. For these reasons, the response is given a mark in Level 1.

Level 2 responses contained fewer inaccuracies and there was evidence of learners bringing in outside knowledge when writing their answers.

An example of a response given a mark in Level 2 can be seen below:



(9)

Chronic villus sampling where you take tissue sample from the placenta. This can be done to find out if your baby may have any issues / disabilities. The pregnant parent would have to understand the risks that as the baby is very young, it can damage if not kill the baby by doing the process. The catheter goes up the vagina into the womb and takes the tissue samples. Both these tests use an ultrasound transducer to monitor the baby on a screen.

Amniocentesis has an injection of amniotic fluid into the womb which goes through the uterus lining. The injection avoids the foetus otherwise it can cause damage to the baby. The Amniocentesis is done at a much later stage than chorionic villus so the foetus has grown more and has developed a lot more in terms of size of body. The risks aren't as great as chorionic villus sampling but it can still damage and if not kill the baby.

I think the chorionic villus sampling is better as it is worth the risk to gain more information on your baby.

Level 2 responses began to show more of an understanding for why these diagnostic tests are performed. Reasons were often still on the generic side, where many responses in Level 2 mentioned checking for diseases, as in the example above. Responses scoring in the top of Level 2 often referenced genetic disorders, or a named example and began to show evidence of learners considering the balance of potential risk vs benefit of the testing. Level 2 responses often included

an attempt at a conclusion, as seen in the example above, but these were rarely more developed than a simple statement on which test was “better”, resulting in an only partially developed evaluation.

Risks were more clearly understood in Level 2 responses and there were often ideas about where these risks came from linked back to the procedures as well as the stage in development. Descriptions of the testing processes were still largely narrative based on the diagrams but often included some further processing, for example the purpose of the ultrasound transducer – as can be seen in the example above. Level 2 responses still may have contained some inaccuracies (as seen above, the misconception about amniotic fluid appears again) but these tended to be limited to one area.

Level 3 responses were less common than those in Level 1 and Level 2. An example of a response given a mark in Level 3 can be seen below:

(c) Prenatal tests give doctors information about the health of a foetus.

Two examples of prenatal tests are chorionic villus sampling and amniocentesis.

Figure 3 shows how samples are taken for each type of test.

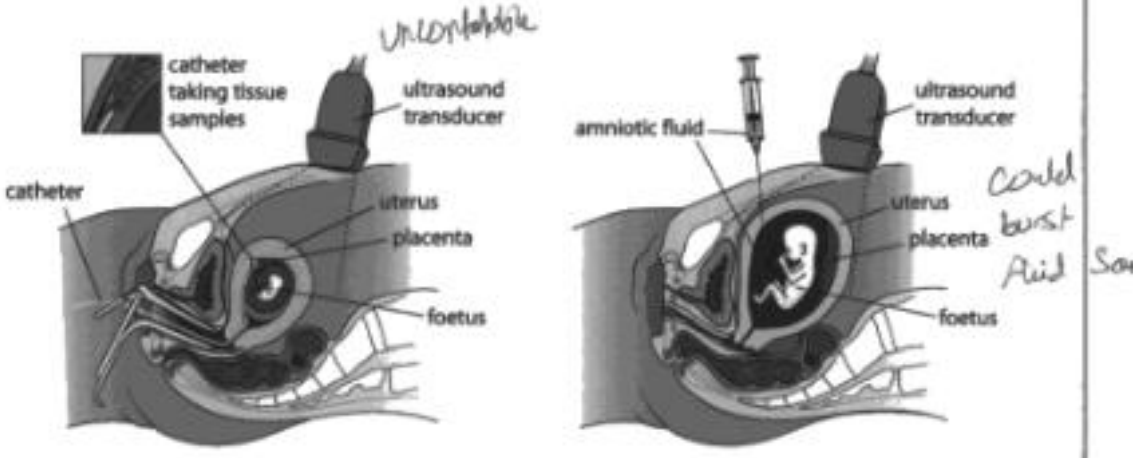


Figure 3

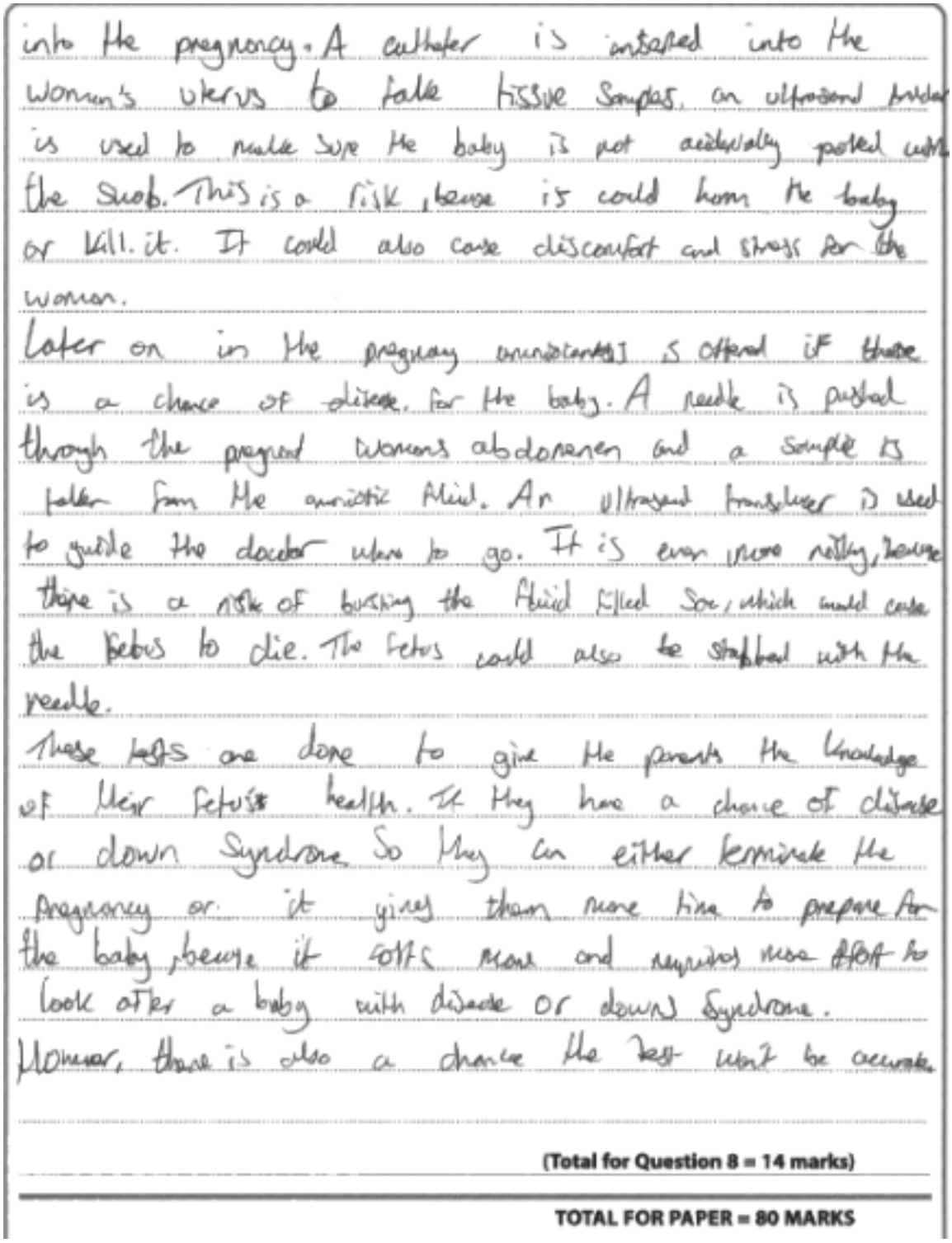
Evaluate the use of amniocentesis and chorionic villus sampling tests during pregnancy.

Your answer should consider:

- the reasons for each test
- the processes
- the risks for each test.

(9)

When a woman is pregnat if diseases like cystic fibrosis, which can be passed down through families ~~if~~ they will have a blood test to see if they are a carrier of the gene, to see if their baby has a chance of having the disease. ~~or~~ If they do they are offered chorionic villus sampling, which is done at about 10 weeks



into the pregnancy. A catheter is inserted into the women's uterus to take tissue samples, an ultrasound probe is used to make sure the baby is not accidentally poked with the swab. This is a risk, because it could harm the baby or kill it. It could also cause discomfort and stress for the woman.

Later on in the pregnancy amniocentesis is offered if there is a chance of disease for the baby. A needle is pushed through the pregnant women's abdomen and a sample is taken from the amniotic fluid. An ultrasound transducer is used to guide the doctor where to go. It is even more risky, because there is a risk of bursting the fluid filled sac, which could cause the bebes to die. The fetus could also be stabbed with the needle.

These tests are done to give the parents the knowledge of their fetus's health. If they have a chance of disease or down Syndrome so they can either terminate the pregnancy or it gives them more time to prepare for the baby, because it costs more and requires more effort to look after a baby with disease or down Syndrome.

However, there is also a chance the test won't be accurate.

(Total for Question 8 = 14 marks)

TOTAL FOR PAPER = 80 MARKS

Learner responses in Level 3 showed a much clearer appreciation of why diagnostic testing is performed, and many introduced the idea that these tests may be offered based on pre-existing risk factors or results from ultrasounds or genetic testing earlier in the pregnancy, as shown in the example above. Risks were much more well understood for both types of testing in Level 3 responses and while there were still descriptions of the procedures these tended to be better explained in

terms of how samples were obtained and what information could be gained from them. Level 3 responses, as shown in the example above, included stronger evaluation considering different aspects of the testing. Whereas responses in Level 2 tended to approach their conclusion only from the aspect of potential harm caused. Level 3 responses took a more considered approach and took into account multiple factors such as timing and information provided from the results as well as potential risks.

Summary

- Where questions have the command word “explain” learners should make sure that they are expanding on the points made rather than restating them in a different way. This is particularly important where questions require learners to explain a difference between two things, a simple statement about each without any further expansion will not gain full credit as an explanation.
- In extended open response questions, it is important that learners bring in knowledge beyond the scope of the information given in the stem, this will allow them to fully develop their lines of argument and demonstrate the detailed knowledge and understanding required for a mark in Level 3.
- As well as symptoms, the causes of specific named conditions within the specification should be covered, especially within the immunology and genetics sections of the specification (sections B and C).
- Learners should be aware that when discussing autoimmune reactions their responses must refer to the role of white blood cells for them to be given full credit.
- As well as being able to discuss the procedures and results of diagnostic tests it is important that learners are aware of why the specific tests named in the specification may need to be administered.

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